

Report

Remedial Investigation/ Risk Assessment/ Feasibility Study

> Former Brass Foundry Area South Tacoma Swamp Tacoma, Washington

> > Volume 2

Amsted Industries, Inc. Chicago, Illinois

USEPA SF

K/J/C 6733 January 1987

1.60

APPENDIX A

GEOENGINEERS' HYDROGEOLOGICAL REPORT

REPORT OF HYDROGEOLOGIC SERVICES

FORMER GRIFFIN WHEEL BRASS FOUNDRY

TACOMA INDUSTRIAL PROPERTIES

TACOMA, WASHINGTON

FOR

KENNEDY/JENKS/CHILTON



(206) 746-5200 2405 - 140th Ave. N.E. Bellevue, WA 98005

Consulting Geotechnical Engineers and Geologists

November 17, 1986

Kennedy/Jenks/Chilton 33301 Ninth Avenue South Federal Way, Washington 98003

Attention: Mr. Nathan Graves

Gentlemen:

We are submitting six copies of our hydrogeologic report for the Tacoma Industrial Properties site in Tacoma, Washington. Our services were authorized under the terms of the subconsultant agreement with your firm that was signed by Mr. Donald Graf on September 30, 1986.

We appreciate the opportunity to be of service to Kennedy/Jenks/Chilton on this assignment. Please contact us if there are any questions regarding our report.

Yours very truly,

GeoEngineers, Inc.

James a. Twell

James A. Miller

Associate

JAM:cs

File No. 1039-01

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REPORT OF HYDROGEOLOGIC SERVICES FORMER GRIFFIN WHEEL BRASS FOUNDRY TACOMA INDUSTRIAL PROPERTIES TACOMA, WASHINGTON

INTRODUCTION AND SCOPE

The results of our hydrogeologic services at the former Griffin Wheel brass foundry are presented in this report. We understand that the Griffin Wheel site is owned by Tacoma Industrial Properties (TIP). The former foundry is located west of Proctor Street, east of Madison Street, and approximately 1000 feet north of South 56th Street. The site location is shown in Figure 1.

The purpose of our services is to develop site-specific geologic and hydrologic information to assist Kennedy/Jenks/Chilton in their evaluation of surface and subsurface contamination at the site. Specifically, our scope of services includes:

- Drilling and installing four ground water monitor wells in the vicinity of the former foundry, at locations approved by Kennedy/Jenks/Chilton and TIP.
- 2. Obtaining soil samples from the borings for examination and analytical testing by Kennedy/Jenks/Chilton.
- Determining well casing elevations for the new monitor wells and three existing EPA wells.
- 4. Measuring water table elevations in each of the seven monitor wells listed above as a basis for determining the ground water flow direction for the water table aquifer.
- 5. Obtaining water samples from the seven monitor wells for analytical testing by Kennedy/Jenks/Chilton and the EPA.
- 6. Researching and describing hydrogeologic conditions in the vicinity of the Griffin Wheel site.

HYDROGEOLOGIC SETTING

The TIP site is located on the floor of an erosional channel that was occupied by a major glacial meltwater stream during the waning stages of the last glaciation of this region, approximately 13,000 years ago. This

4-mile-long meltwater valley is locally referred to as the "South Tacoma Channel." The channel is incised as much as 150 feet below the rolling upland area that is occupied by residential and commercial districts of Tacoma. The channel extends north and east of the TIP site to the vicinity of the intersection of South Tacoma Way and Yakima Avenue. South of the study area, the glacial channel widens and opens into a broad glacial outwash plain that is underlain by highly permeable gravel.

The "South Tacoma Swamp" is located immediately north and west of the TIP site. This lowlying portion of the valley floor has been partly filled and drained.

No creeks or streams are present in the vicinity of the TIP property. The headwater area of Flett Creek is present approximately 6000 feet south of the TIP site. Flett Creek drains into Chambers Creek and then into Puget Sound.

The Tacoma-Pierce County Health Department has completed a regional geohydrologic study of the Clover/Chambers Creek drainage basin. The results of that study are included in a July 1985 report prepared by Brown and Caldwell entitled "Clover/Chambers Creek Geohydrologic Study." The Brown and Caldwell report indicates that the TIP site is located in an area where potential contamination of shallow and deep aquifers is possible. The report also indicates a ground water flow direction that is generally westward in the vicinity of the TIP site.

LOCAL WATER WELLS

Numerous water wells have been drilled in and near the South Tacoma Channel. We researched the well logs on file at the Tacoma-Pierce County Health Department to determine the approximate location and capacity of wells within one mile of the TIP site.

The City of Tacoma owns several municipal wells in a well field located 3000 to 7000 feet north-northeast of the TIP site. Some of these wells are capable of yields in excess of 3000 gpm. This well field does not appear to be downgradient of the TIP site.

The Town of Fircrest owns three municipal wells located 8000 to 10,000 feet northwest of the TIP site. Based on information presented in the Brown and Caldwell report, these wells are not located downgradient from the TIP site.

The University Place Water Company owns three public supply wells located approximately 8000 feet northwest of the TIP site. These wells do not appear to be located downgradient from the TIP site.

Based on available well records, the closest potential downgradient well is located approximately 2500 feet west of the TIP site. This private well at 5402 South Mullen Street is 110 feet deep and has a high reported iron content.

SITE CONDITIONS

SURFACE DESCRIPTION

Tacoma Industrial Properties owns approximately 17 acres of property between Madison Street and Burlington Way. Our investigation was limited to a 2.5-acre parcel formerly owned by the Griffin Wheel Foundry.

The foundry site is occupied by an abandoned two-story brick office building and a vacant wood frame foundry building. Most of the ground surface adjacent to the foundry building is covered with black to dark green "slag." Cinder debris and slag are exposed along the face of a 10-foot slope between the foundry and Madison Street. Ground cover in the vicinity of the two buildings includes a maintained lawn, blackberry bushes, dense underbrush, trees and bare ground. Ground surface elevations range from 235 to 250 feet above sea level.

SUBSURFACE SOIL CONDITIONS

Subsurface soil conditions beneath the site were explored by drilling four borings at the approximate locations shown in Figure 2. Details of the field exploration program are given in Appendix A.

The borings encountered silty fine sand overlying gravelly sand. The silty fine sand extends from the surface to a depth of approximately 7 feet at the boring locations. The gravelly sand unit was deposited by glacial meltwater during formation of the South Tacoma Channel. The base of the gravelly sand unit was not reached in the borings.

SITE GROUND WATER CONDITIONS

Ground water conditions at the site were explored by installing a permanent monitor well in each boring. Construction details for the wells are included in Appendix A. Information regarding ground water conditions in and near the Griffin Wheel site was supplemented by measuring and sampling three existing monitor wells installed by the EPA in 1983. We determined the water table elevation in each monitor well on September 26, 1986.

The water table at the site ranged from 18 to 32 feet below ground surface in September. Ground water occurs in an unconfined condition within the gravelly sand unit encountered in the monitor well borings. Contours of the water table for September 26 field data are shown in Figure 2. Based on water table contours, the ground water flow direction beneath the site is generally northwesterly.

UNDERGROUND TANKS

The presence of soil contamination by hydrocarbons was noted in Boring MW-2, which is located in proximity to two buried fuel tanks. No free (floating) hydrocarbons were found on the water table in Well MW-2 in September.

We discovered a third underground tank along the west wall of the office building, approximately 25 feet east of Boring MW-1. Well MW-1 showed no signs of visible hydrocarbon contamination.

LIMITATIONS

We have prepared this report for use by Tacoma Industrial Properties; Kennedy/Jenks/Chilton; and other organizations as authorized by Tacoma Industrial Properties. The information contained in this report pertains to the evaluation of subsurface contamination on the parcel of property at 5202 South Proctor Street. This report is not intended for other uses and the information presented may not be applicable to other sites.

Our interpretations of subsurface conditions are based on data from widely spaced boreholes at the site. It is possible that areas with undetected contamination may exist in areas of the site that were not explored by drilling.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in this area at the time the report was prepared. No other conditions, express or implied, should be understood.

- o O o -

Please contact us if you have any questions regarding this report.



Respectfully submitted,

GeoEngineers, Inc.

Scott E. Widness / by JAm

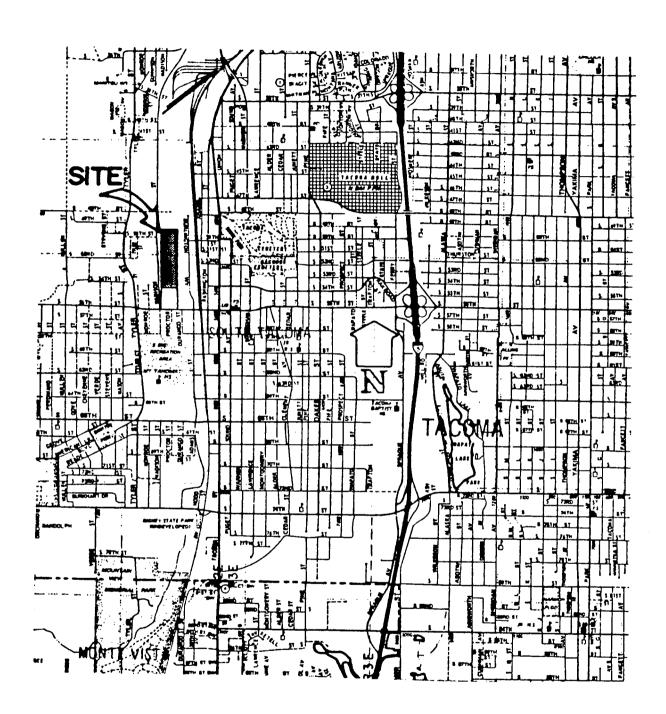
Scott E. Widness Geological Engineer

James a. Triller

James A. Miller

Associate

SEW: JAM:cs



Not to Scale

Kennedy/Jenks/Chilton

TIP Management Inc. Tacoma, Washington

> Location Map K/J/C 6733

January 1987

Figure

APPENDIX A

FIELD EXPLORATIONS

DRILLING AND SOIL SAMPLING PROGRAM

Subsurface conditions at Tacoma Industrial Properties were explored by drilling four borings at the approximate locations indicated in Figure 2. The borings were drilled between September 15 and 17, 1986 to depths ranging from 31.0 to 44.5 feet using truck-mounted, hollow-stem auger drilling equipment owned and operated by FLD Industries. The soil sampling equipment was cleaned with a pressure washer between each sampling attempt. The drilling equipment was cleaned in the same manner between each boring.

A geological engineer from our staff determined the boring locations, examined and classified the soils encountered, and prepared a detailed log of each boring. Soils encountered were classified visually in general accordance with ASTM D-2487-83, which is described in Figure A-1. An explanation of the boring log symbols is presented in Figure A-2. The boring logs are given in Figures A-3 through A-6.

Relatively undisturbed soil samples were obtained from each boring using a 2-inch-diameter split-spoon sampler (1.5-inch ID). the sampler was driven 18 inches by a 140-pound weight falling a vertical distance of 30 inches. The number of blows needed to advance the sampler the final 12 inches is indicated to the left of the corresponding sample notations on the boring logs. A surface grab sample was also obtained at each drill site.

All soil samples obtained at the site were retained by Kennedy/Jenks/Chilton. Chemical analyses were done on selected samples. Those samples for which chemical testing was done are labeled with a "CA" on the monitor well logs.

MONITOR WELL CONSTRUCTION

Two-inch-diameter, Schedule 40 PVC pipe was installed in each boring at the completion of drilling. The lower portion of the PVC pipe is machine slotted (0.02-inch slot width) to allow entry of water into the well casings.

Medium silica sand was placed in the borehole annulus surrounding the slotted portion of the wells. The remainder of the annular space was filled with a bentonite/native soil mix. Monitor well construction is indicated in Figures A-3 through A-6.

The monitor wells were developed on September 18, 1986 by removing water from the wells with a stainless steel bailer. We determined the elevations of the well casings to the nearest 0.01 foot with an engineer's level on September 18, 1986. An elevation datum of 239.28 feet was used for the top of the steel casing over CBS-05. Elevations referenced to this datum are included on the monitor well logs.

GROUND WATER SAMPLING PROGRAM

Ground water samples were collected from all seven monitor wells by GeoEngineers and Kennedy/Jenks/Chilton September 26, 1986. The water samples were collected with a stainless steel bailer after a minimum of three well volumes of water was removed from each well casing. The water samples were transferred to septum vials in the field and kept cool during transport to the testing laboratory.

The bailer was cleaned prior to each sampling attempt with a fresh water rinse, tri-sodium phosphate wash, and a second fresh water rinse which was followed by a distilled water rinse.

Representatives from the Washington State Department of Ecology and the U.S. Environmental Protection Agency were present during our sampling of the three previously installed EPA monitor wells. Access to these wells was provided by the EPA.

GROUND WATER ELEVATIONS

The depth to the ground water table relative to the monitor well casing rims was measured on September 26, 1986. The site measurements were made using an electric water level indicator. Ground water elevations were calculated by subtracting the water table depth from the casing rim elevations. Water table positions measured on September 26, 1986 are shown on the monitor well logs.

SOIL	CLA	SSIF	CATION	SYSTEM
SOIL	ULF	OOIL	ICATION	SISIEM

·			GROUP	
MAJOR DIVISIONS		SYMBOL	GROUP NAME	
COARSE	GRAVEL	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
GRAINED			GP	POORLY-GRADED GRAVEL
SOILS	MORE THAN 50% OF COARSE FRACTION	GRAVEL WITH FINES	GM	SILTY GRAVEL
MORE THAN 50%	ON NO. 4 SIEVE		GC	CLAYEY GRAVEL
RETAINED ON NO. 200 SIEVE	SAND	CLEAN'SAND	sw	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
	MORE THAN 50% OF COARSE FRACTION	SAND WITH FINES	SM	SILTY SAND
	PASSES NO. 4 SIEVE		sc	CLAYEY BAND
FINE	SILT AND CLAY	INORGANIC	ML	SILT
GRAINED			CL	CLAY
SOILS	LIQUID LIMIT LEBS THAN 50	ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
MORE THAN 50% PASSES NO. 200 SIEVE	SILT AND CLAY	INORGANIC	мн	SILT OF HIGH PLASTICITY, ELASTIC SILT
			СН	CLAY OF HIGH PLASTICITY, FAT CLAY
	LIQUID LIMIT 50 OR MORE	ORGANIC	он	ORGANIC CLAY, ORGANIC BILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

- Field classification is based on visual examination of soil in general accordance with ASTM D2488-83.
- 2. Soil classification using laboratory tests is based on ASTM D2487-83.
- Descriptions of soil density or consistency are based on interpretation of blowcount data, visual appearance of soils, and/or test data.

SOIL MOISTURE MODIFIERS:

- Dry Absence of moisture, dusty, dry to the touch
- Moist Damp, but no visible water
- Wet ~ Visible free water or saturated, usually soil is obtained from below water table

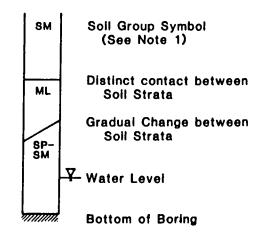


SOIL CLASSIFICATION SYSTEM

LABORATORY TESTS:

- AL Atterberg limits
- **CP** Compaction
- CS Consolidation
- DS Direct shear
- GS Grain-size analysis
- HA Hydrometer analysis
 - K Permeability
- M Moisture content
- MD Moisture and density
- SP Swelling pressure
- TX Triaxial compression
- **UC** Unconfined compression

SOIL GRAPH:



BLOW-COUNT/SAMPLE DATA:

Blows required to drive sampler 12 inches or other Indicated distances using 140 pound hammer falling 30 inches.

*P" indicates sampler pushed with weight of hammer or hydraulics of drill rig. 22 **I**

Location of relatively undisturbed sample

Location of disturbed sample

P Location of sampling attempt with no recovery

10 Location of s

Location of sample attempt using Standard Penetration Test procedures

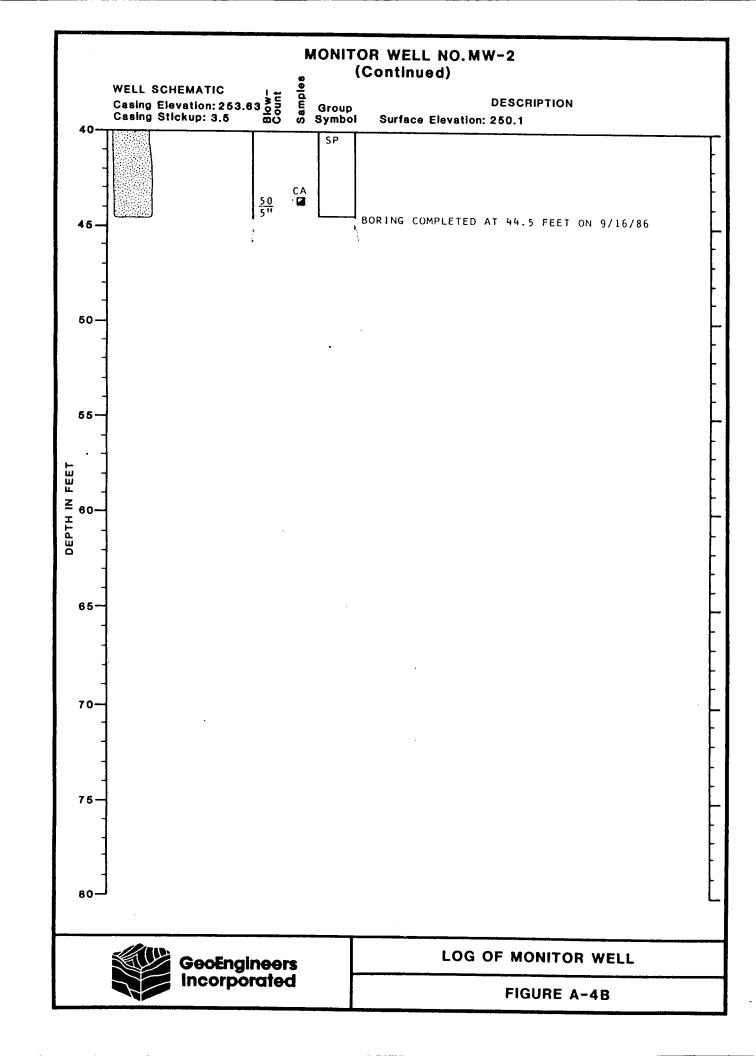
NOTES:

- 1. Soil classification system is summarized in Figure A-1.
- 2. The reader must refer to the discussion in the report text as well as the exploration logs for a proper understanding of subsurface conditions.



KEY TO BORING LOG SYMBOLS

FIGURE A-4A



APPENDIX B

WORK PLAN

APPENDIX B

WORK PLAN
(Tasks 4 through 8)

Task 4. Provide Support for Interim Remedial Measure (IRM)

Kennedy/Jenks/Chilton will provide support during the implementation of an initial remedial measure (expected to be removal of shallow soil and foundry materials in the vicinity of TP-6, installed previously by others, and removal of oil from underground tanks on the north side of the brass foundry building). This task will be executed during our site characterization activities. A composite of several grab samples of soil in the vicnity of former TP-6 will be collected for analysis to determine disposal requirements. The sample will be analyzed for flash point, heavy metal scan, EP toxicity, PCBs, sulfides, phenols, and cyanide.

Kennedy/Jenks/Chilton will provide resident engineering during soil removal. The field engineer will complete an inspection report and make visual observations of the extent of wastes in the excavation.

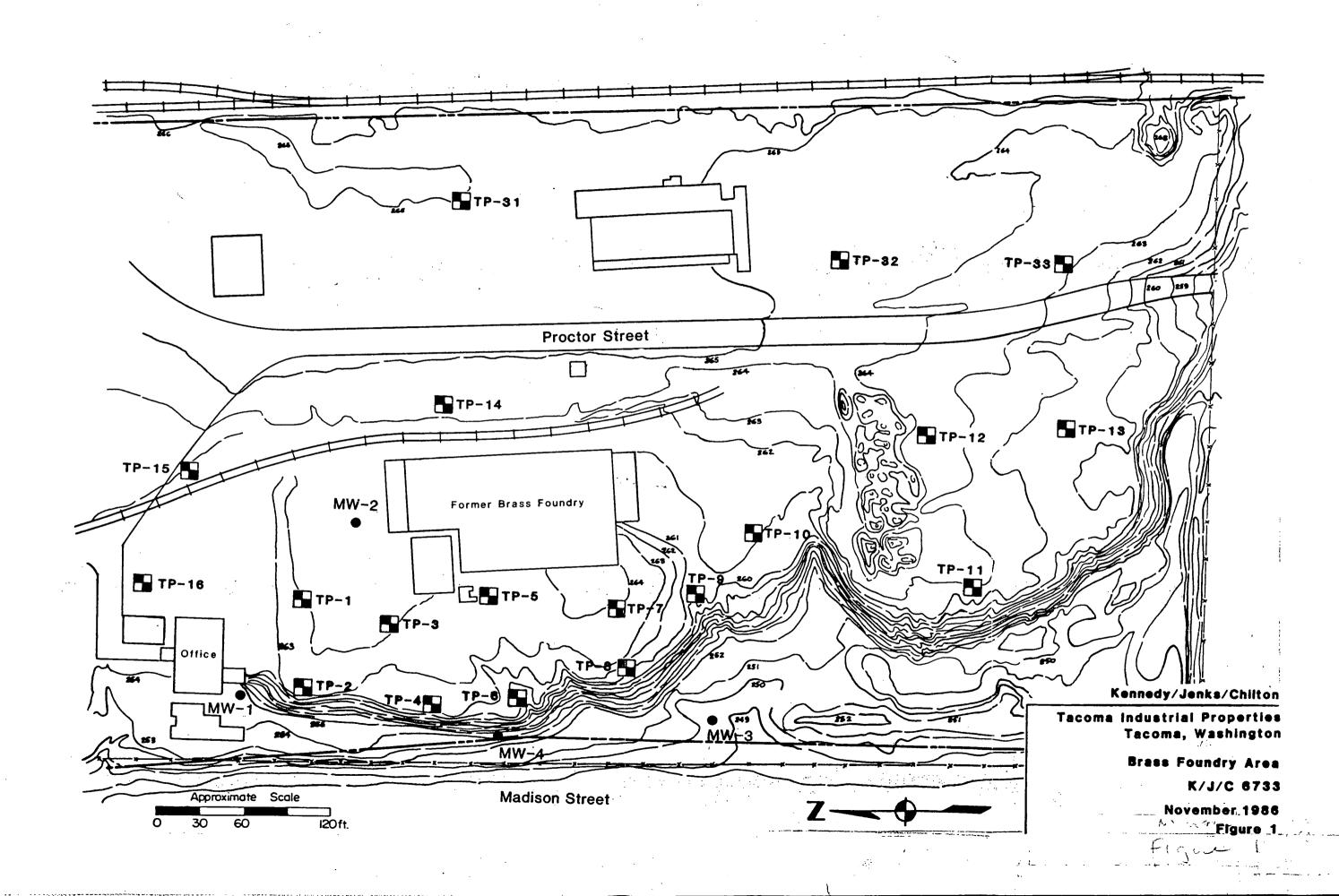
Task 5. Additional Site Characterization

Our approach to sampling and analysis at the site is to gather sufficient information so that remedial actions for the identified problem areas on the site may be defined. Sampling and analysis will concentrate on the areas of the site found to contain elevated levels of heavy metals during previous investigations. The scope of our proposed additional investigation is given below.

Proposed Investigations

Soil Borings and Groundwater Investigation — Four groundwater monitor wells will be installed in the area of the former brass foundry. Groundwater flow direction was assessed during past studies by EPA and resulted in an expected flow of southeast to northwest. One well is anticipated upgradient of areas of elevated metals concentrations as found during previous investigations, and three wells are anticipated downgradient of the area. Locations for the wells are shown in Figure 1. In addition, groundwater wells installed by EPA during past studies in the vicinity of the site will be sampled if access to these wells is granted by EPA. TIP will be responsible for obtaining access to the EPA wells.

Surface and Subsurface Soil Sampling - Selected samples collected during previous investigations (we understand all samples previously collected are in cold storage) will be used for assessing total metals concentrations in surface and subsurface soils onsite. In addition, surface and shallow subsurface soil samples will be grab sampled to assess the extent of elevated metals levels in the immediate area of the brass foundry.



Building Material Sampling - Collection of up to five samples of brass foundry building material/waste is planned to further assess remedial action needs for the building and to compare building waste with materials disposed in the soil onsite.

Laboratory tests simulating building decontamination activities are also planned to assess if the levels of metals in the building could be reduced prior to building demolition.

Air Monitoring - Five temporary air monitoring stations will be selected, with personal air sampling pumps used to collect particulate samples on two separate days. Four sampling pumps will be located in the vicinity of the old brass foundry building. The final air sampling pump will be attached to one onsite worker. This monitoring program should assess if high levels of lead are currently being transported offsite or if onsite personnel could be exposed to high levels of lead (assuming no remedial action were taken).

Other Investigations - Drums located throughout the site, containers within the brass foundry building, and debris within the brass foundry building will be characterized and disposed under a separate investigation/cleanup effort and is not addressed in this work plan.

Chemical Analyses

Soil Boring Samples and Groundwater Samples - Surface samples and samples collected at shallowest depth from each boring will be analyzed for lead and soil pH. The soil samples collected within the groundwater table at each boring will be analyzed for total organic carbon. Groundwater samples from each well will be analyzed in the field for pH, conductivity, oxidation reduction potential, and temperature, as well as for total and dissolved lead and copper in the laboratory. Three selected soil samples will also be subjected to a modified leaching test which is similar in nature to the EP toxicity test, except simulated rainwater is used rather than acidic liquids. This test should provide a more accurate representation of actual contaminant mobility in the environment. Other samples will be held for possible future analyses, if required.

Backhoe Pit Samples (from previous investigations) - The two shallow samples from five selected backhoe pits as well as surface grab samples collected during our study will be analyzed for total lead and copper. In addition, two shallow samples also will be analyzed for cadmium, copper, and zinc.

Building Waste Samples - All samples will be analyzed for EP toxicity lead and for total lead. One of these samples exhibiting high extractable lead will also be analyzed for target EP toxicity metals.

Air Quality Samples - Particulate filters will be analyzed for lead and inorganic lead compounds utilizing NIOSH protocol.

Drilling Protocol

Well Construction - All wells will be drilled using a hollow stem auger. Each well will consist of two- or four-inch diameter, Schedule 40, PVC pipe, the lower portion of which will be completed with ten feet of machine slotted well screen and a bottom plug. The annular space around the screen will be packed with sand. A bentonite/native soil seal will be placed above the sand pack to the ground surface. All wells will be completed above grade with a locking PVC end cap. Following installation, each well will be developed to stabilize the soils around the well. Water level elevations will be assessed with an engineers level.

Sampling Protocol

Well Construction - A field geologist or engineer will log each well boring and obtain soil samples at no less than five-foot intervals. Additional samples may be collected at more closely spaced intervals for visual inspection and possible physical testing. The soil samples will be collected with a drive sampler and samples will be transferred to clean glass jars. Soil samples will be placed in containers with ice.

Groundwater Sampling - All wells will be purged of three to five well volumes prior to sampling. Samples will be collected using a bailer. Containers and preservation techniques will vary according to analysis and will be consistent with 40 CFR Part 136.

Building Material Sampling - Soil and/or waste in the building will be sampled using plastic scoops or steel trowels. Samples will be collected in glass containers and placed on ice for transport to the laboratory.

Air Samples - Samples will be collected for a minimum of six hours and will be collected onto a membrane filter at an approximate flow rate of 1.5 liters per minute. Pumps will be calibrated prior to and following sampling. In addition, predominant wind direction and velocity, temperature, and barometric pressure averaged for the day will also be obtained and noted.

Sample Documentation - All field activities, boring logs, visual observations and sample information will be recorded in a bound field notebook. Each sample will be given a sample number and labeled. Chain-of-custody forms will be completed for all samples collected and will be returned to the laboratory with the samples.

Aquifer Testing

Aquifer testing should not be required unless dissolved metals are detected in significant quantities in groundwater (which is not expected). If aquifer testing is determined to be necessary, we will conduct the test as an additional scope/budget item.

Decontamination

All downhole drilling equipment, sampling equipment, and any other equipment used in soil borings or sampling will be steam cleaned between use to prevent cross-contamination.

All sampling locations will be suitably staked following sampling. In addition, all sampling locations will be recorded and plotted on a base site map (supplied by TIP) by measuring distances (using a tape and compass) from known landmarks.

Task 6. Environmental and Health Issues and Risks Analyses

The purpose of this task is to organize the data obtained during the above tasks and previous field activities by other and to review it against a framework of regulatory and non-regulatory concerns. The finding of this task will be the basis for development and evaluation of alternative remedial actions in Task 7.

Information to be analyzed in the evaluation of the site's environmental and health issues and risks include the following:

- o Nature and properties of identified contaminants,
- o Potential for contaminant mobility and suspected exposure pathways,
- Potential human receptors or sensitive biological areas at risk, and
- o Regulatory requirements.

Two types of potential exposure will be addressed. The first involves exposure from residual contamination remaining at the site. It must be recognized that, despite implementation of a Remedial Action Plan approved by regulatory agencies, complete protection from future localized problems cannot be precluded. Potential complaints may come from future occupants due to direct exposure during uncovering of residual contamination encountered during excavation for basements, sewers, piping, etc. These exposure routes will be addressed during our evaluations and will be reflected in the development of remedial alternatives. A second type of potential exposure is movement of identified chemicals from the site to the surrounding environment by air, groundwater, or surface water. The transport of contaminants left in the soil or groundwater will be estimated using relatively simple models, such as estimating a contaminant's relative velocity based on soil adsorption coefficients.

Current regulatory requirements will be a significant factor in interpretations of the field data as they relate to cleanup and

development of the site. Kennedy/Jenks/Chilton will review regulatory requirements as they pertain to residual contamination and the site's potential future liabilities.

Task 7. Remedial Action Alternatives

Kennedy/Jenks/Chilton will develop and evaluate remedial action alternatives for the site, based on previous field investigations, Kennedy/Jenks/Chilton's additional site characterization, and evaluation of the site's environmental and health issues and risks. The remedial alternative development and evaluation will be similar to the guidelines provided by the U.S. EPA for Feasibility Studies under the NCP. Initially, potential remedial technologies will be screened for applicability to the different specific problem areas of the site will be eliminated from further consideration. Technologies will be screened on the basis of general criteria, including technical feasibility, environmental and public health impacts, and preliminary cost estimates.

Technologies that survive the preliminary screening process will be developed into feasible alternatives that could be implemented at the Alternatives relevant to specific identified problems on the site will be developed. Each feasible remedial alternative will then be subjected to a detailed evaluation in an effort to identify costeffective alternative(s) acceptable for the site. Factors to be considered during the detailed evaluation will include cost and non-cost criteria, including technical feasibility, institutional issues, public health issues, environmental impacts, and cost criteria. Technical feasibility analysis will address performance, reliability, constructability, safety and time constraints involved in remediating the site. Institutional issues involve compliance status of each remedial alternative with federal and state regulatory requirements and conditions for non-attainment of relevant standards. The public health analysis will involve an evaluation of the types, toxicity, and potential for release of identified chemicals at the site. The environmental assessment will address each alternative's impact on sensitive environmental

Cost analysis of each feasible alternative will involve an estimation of estimated capital and 0 & M costs, present worth analysis, and sensitivity analysis for key design criteria or cost factors.

Following the detailed evaluation of alternatives, Kennedy/Jenks/Chilton will recommend a preferred remedial alternative(s) for the site.

Task 8. Report Preparation

Kennedy/Jenks/Chilton will prepare a final report that will include comments on the draft report for submittal to TIP and appropriate regulatory agencies. In addition, the Kennedy/Jenks/Chilton project team is available to assist TIP in meetings with the appropriate regulatory agencies to gain necessary approvals for the selected remedial alternative(s).

APPENDIX C

LABORATORY ANALYSES REPORTS

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415 362 6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 9/17/86 10/28/86

10/20/00

(K/J/C 6733)

Lab. No.

865551

Source

Soil I.D.: MW-1A

TIP

Tacoma, WA

Date Collected

9/15/86

Time Collected

1152

Collected by

K/J/C

Analysis

Analytical Results

pН

Unit

Units

6.3

Lead (Pb) (2)

mg/Kg (1) 84

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____RS,_AD_

Manager

Leverett R. Smith

cc: Nathan Graves, K/J/C, Federal Way, WA
This report applies only to the sample investigated and is not necessarily indicative of the quality of apparently identical or similar samples.
The liability of the laboratory is limited to the amount paid for the report by the issuee. The issuee assumes all liability for the further distribution of this report or its contents and by making such distribution agrees to hold the laboratory harmless against all claims of persons so informed of the contents hereof.

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address 33

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 9/17/86 10/28/86

(K/J/C 6733)

Lab. No.

865552

Source

Soil I.D.: MW-1B

TIP

Tacoma, WA

Date Collected

9/15/86

Time Collected

1205

Collected by

K/J/C

Analysis

Units

Analytical Results

рH

Unit

6.0

Lead (Pb) (2)

mg/Kg(1) <3

Comments: (1) Milligrams per kilogram, wet (as received) weight basis.
(2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst RS, AD

Manager _

resett R. Smith

cc: Nathan Graves, K/J/C, Federal Way, WA
This report applies only to the sample investigated and is not necessarily indicative of the quality of apparently identical or similar samples.
The hability of the laboratory is limited to the amount paid for the report by the issuee. The issuee assumes all liability for the further distribution of this report or its contents and by making such distribution agrees to hold the laboratory harmless against all claims of persons so informed of the contents hereof.

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention

Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received

9/17/86

Reported 10/28/86

(K/J/C 6733)

Lab. No.

865553

Source

Soil I.D.: MW-1F

TIP

Tacoma, WA

Date Collected

9/15/86

Time Collected

1306

Collected by

K/J/C

Analysis

Units

Analytical Results

Oil and Grease

mg/Kg (1) 610

Comments: (1) Milligrams per kilogram, wet (as received) weight basis.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst _____RS

Manage

Leverett R. Smith

cc: Nathan Graves, K/J/c, Federal Way, WA
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Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Steet San Francisco, California 94105 415-362-6065

For Attention

Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported

9/17/86 10/28/86

(K/J/C 6733)

Lab. No.

865554

Source

Soil I.D.: MW-1G

TIP

Tacoma, WA

Date Collected

9/15/86

Time Collected

1306

Collected by

K/J/C

Analysis

Units

Analytical Results

Total Organic

Carbon (C) (2)

mg/Kg (1) 70

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Dohrmann DC-50 Organic Carbon Analyzer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____AL__

so informed of the contents hereof,

Manager _

CC: Nathan Graves, K/J/C. Federal Way WA. This report applies only to the sample investigated and is not necessarily indicative of the quality of apparently identical or similar samples. The liability of the laboratory is limited to the amount paid for the report by the issuee. The issuee assumes all liability for the further distribution of this report or its contents and by making such distribution agrees to hold the laboratory harmless against all claims of persons

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

Owen Loshbough 33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported

9/17/86 10/28/86

(K/J/C 6733)

Lab. No.

865557

Source

Soil I.D.: MW-2A

TIP

Tacoma, WA

Date Collected

9/15/86

Time Collected

1527

Collected by

K/J/C

Analysis

Units

Analytical Results

pН

Unit

6.9

Lead (Pb) (2)

mg/Kg (1) 2800

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____A

Manager

ferest R. Smith

cc: Nathan Graves, K/J/C, Federal Way, WA

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Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported

Analytical Results

9/17/86 10/28/86

(K/J/C 6733)

Lab. No.

865558

MW-2B

Source

Soil I.D.:

TIP

Tacoma, WA

Date Collected

9/15/86

Time Collected

1538

Collected by

K/J/C

Analysis

Units

pН

Unit

7.5

Lead (Pb) (2)

mg/Kg (1) 4200

(1) Milligrams per kilogram, wet (as received) weight basis. Comments: (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst .

Manager ₋

Nathan Graves, K/J/C, Federal Way, WA

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Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415 362-6965

For Attention

Kennedy/Jenks/Chilton

Nathan Graves

Address 33301 Ninth Av

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported

11/5/86 12/2/86

(K/J/C 6733)

Lab. No.

867790

Source

MW-2C

TIP

Tacoma, WA

Date Collected

9/15/86

Time Collected

Collected by

K/J/C

Analysis

Units

Analytical Results

T. Lead (Pb)

mg/Kg

54

Comments: (1) Milligrams per kilogram, wet (as received) weight basis.

(2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW—846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ______ BC______ Manager ______ Waste _____ Manager ______ Reveal R. Smith

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Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415 362-6065

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Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 9/17/86

10/28/86

(K/J/C 6733)

Lab. No.

865559

Source

Soil I.D.: MW-2F

TIP

Tacoma, WA

Date Collected

9/15/86

Time Collected

1611

Collected by

K/J/C

Analysis

Units

Analytical Results

Oil and Grease

mg/Kg (1) 6700

Comments: (1) Milligrams per kilogram, wet (as received) weight basis.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____RS

so informed of the contents hereof.

Manager

cc: Nathan Graves, K/J/C, Federal Way, WA.
This report applies only to the sample investigated and is not necessarily indicative of the quality of apparently identical or similar samples. The hability of the laboratory is limited to the amount paid for the report by the issuee. The issuee assumes all liability for the further distribution of this report or its contents and by making such distribution agrees to hold the laboratory harmless against all claims of persons

Kennedy/Jenks/Chilton, Laboratory Division

657 Howard Street San Francisco, CA 94105 415-362-6065 Received 9/17/86 Reported 12/2/86

Soil Analysis Report

For:

Kennedy/Jenks/Chilton

Attn:

Nathan Graves

Address:

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

(K/J/C 6733)

Lab. No.:

865559

Source:

MW-2F

TIP

Tacoma, WA

Date Collected:

9/15/86

Time Collected:

1610

Collected by:

K/J/C

Analysis	Units *		Analytical	Results
PURGEABLES				
Benzene	ug/Kg	<8		
Chlorobenzene	ug/Kg	<8		
1,2-Dichlorobenzene	ug/Kg	<8		
1,3-Dichlorobenzene	ug/Kg	<8		
1,4-Dichlorobenzene	ug/Kg	<8		
Ethylbenzene	ug/Kg	38		
Toluene	ug/Kg	10		
Total xylenes	ug/Kg	90		

Comments: Analysis by EPA Method 8020 (Purgeable Aromatics).

* Micrograms per kilogram, wet (as received) weight basis

Analyst BC

Manager Leverth R. Smith

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415 362 6065

For Attention

Address

Kennedy/Jenks/Chilton

Nathan Graves

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 11/5/86 12/2/86

(K/J/C 6733)

Lab. No.

867791

Source

MW-2G

TIP

Tacoma, WA

Date Collected

9/15/86

Time Collected

1618

Collected by

K/J/C

Analysis

Units

Analytical Results

Oil and Grease

mg/Kg

32,000

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst _

Manager .

Kennedy/Jenks/Chilton, Laboratory Division

657 Howard Street

San Francisco, CA 94105

415-362-6065

Total xylenes

Soil Analysis Report

For:

Kennedy/Jenks/Chilton

Attn:

Nathan Graves

Address:

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

(K/J/C 6733)

Received 11/5/86

Reported 12/2/86

Lab. No.: 867791 Source: MW-2G TIP Tacoma, WA Date Collected: 9/15/86 Time Collected: 1618 K/J/C Collected by: Analysis Units * Analytical Results **PURGEABLES** Benzene mg/Kg <0.5 <0.5 Chlorobenzene mg/Kg 1,2-Dichlorobenzene mg/Kg <0.5 1,3-Dichlorobenzene mg/Kg <0.5 1,4-Dichlorobenzene <0.5 mg/Kg Ethylbenzene mg/Kg 0.8 Toluene mg/Kg <0.5

Comments: Analysis by EPA Method 8020 (Purgeable Aromatics).

mg/Kg

* Milligrams per kilogram, wet (as received) weight basis

5.9

Analyst	BC	
---------	----	--

Manager Leverett R. Smith

Kennedy/Jenks/Chilton

Laboratory Division

657 Floward Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Nathan Graves

Address 33301 1

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Federal Way, WA 98003

Received Reported 11/5/86 12/2/86

(K/J/C 6733)

Lab. No.

867792

Source

MW-2H

TIP

Tacoma, WA

Date Collected

9/15/86

Time Collected

K/J/C

Collected by

Analysis Units

Analytical Results

Oil and Grease

mg/Kg

210

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste – Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22. Div. 4".

Analyst ____RS

Manager

Kennedy/Jenks/Chilton, Laboratory Division

657 Howard Street San Francisco, CA 94105 415-362-6065 Received 11/5/86 Reported 12/2/86

Soil Analysis Report

For:

Kennedy/Jenks/Chilton

Attn:

Nathan Graves

Address:

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

(K/J/C 6733)

Lab. No.:

Source:

MW-2H

867792

TIP

Tacoma, WA

Date Collected:

9/15/86

Time Collected:

_

Collected by:

K/J/C

Analysis	Units *		Analytical	Results	
PURGEABLES					
Benzene	mg/Kg	<0.5			
Chlorobenzene	mg/Kg	<0.5			
1,2-Dichlorobenzene	mg/Kg	<0.5			
1,3-Dichlorobenzene	mg/Kg	<0.5			
1,4-Dichlorobenzene	mg/Kg	<0.5			
Et hylbenzene	mg/Kg	<0.5			
Toluene	mg/Kg	<0.5			
Total xylenes	mg/Kg	<0.5			

Comments: Analysis by EPA Method 8020 (Purgeable Aromatics).

* Milligrams per kilogram, wet (as received) weight basis

Analyst BC

Manager Leverelt R. Smith

Kennedy/Jenks/Chilton

Laboratory Division

657 Floward Street San Francisco, California 94105 415-362-6065

For Attention

Kennedy/Jenks/Chilton

Owen Loshbough

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 9/17/86 10/28/86

(K/J/C 6733)

Lab. No.

Address

865560

Source TIP Soil I.D.: MW-2J

TIP

Tacoma, WA

Date Collected

9/16/86

Time Collected

0910

Collected by

K/J/C

Analysis

Units

Analytical Results

Total Organic

Carbon (C) (2)

mg/Kg (1) 120

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Dohrmann DC-50 Organic Carbon Analyzer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____AL

_ Manager _

iger Keverett R. Smith

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported

Analytical Results

9/19/86 10/24/86

(K/J/C 6733)

Lab. No.

865591

Source

Soil I.D.:

MW-3A

TIP

Tacoma, WA

Date Collected

9/17/86

Time Collected

0854

Collected by

K/J/C

Analysis

Units

pН

Unit 5.6

Lead (Pb) (2)

mg/Kg (1) 140

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

LP, AD Analyst .

Manager _

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

33301 Ninth Avenue South, Suite 100 Address

Federal Way, WA 98003

Received Reported 9/19/86 10/24/86

(K/J/C 6733)

Lab. No.

865592

Source

Soil I.D.: MW-3B

TIP

Tacoma, WA

Date Collected

9/17/86

Time Collected

0950

Collected by

K/J/C

Analysis

Units

Analytical Results

pН

Unit

6.0

Lead (Pb) (2)

mg/Kg(1)<3

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

LP, AD Analyst .

Manager _

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention

Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 9/19/86 10/24/86

(K/J/C 6733)

Lab. No.

865593

Source

Soil I.D.: MW-3G

TIP

Tacoma, WA

Date Collected

9/17/86

Time Collected

1053

Collected by

K/J/C

Analysis

Units

Analytical Results

Total Organic

Carbon (C) (2)

mg/Kg (1) 83

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Dohrmann DC-50 Organic Carbon Analyzer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW—846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____AL

Manager

cc: Nathan Graves, K/J/C, Federal Way, WA
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Kennedy/Jenks/Chilton

Laboratory Division

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For Attention

Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received 9/ Reported 10

9/19/86 10/24/86

(K/J/C 6733)

Lab. No.

865594

Source TIP Soil I.D.: MW-4A

Tacoma, WA

Date Collected

9/17/86

Time Collected

1255

Collected by

K/J/C

Analysis	Units		Analytical Results
рН	Unit	5.9	
Lead (Pb) (2)	mg/Kg (1)	440	
Copper (Cu) (2)	mg/Kg (1)	150	
Cadmium (Cd) (2)	mg/Kg (1)	0.59	
Zinc (Zn) (2)	mg/Kg (1)	430	

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste – Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst LP, AD

Manager .

- D. Smith

EP Toxicity Analysis Report

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For

Kennedy/Jenks/Chilton

Owen Loshbough

Attention Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 9/19/86 10/24/86

(K/J/C 6733)

Lab. No.

865594

Source

Soil I.D.: MW-4A

TIP

Tacoma, WA

Date Collected

9/17/86

Time Collected

1255

Collected by

K/J/C

Contaminant	Units	Concentration in Extract (1)
Cadmium (Cd) (2)	mg/L	<0.01
Copper (Cu) (2)	mg/L	0.02
Zinc (Zn) (2)	mg/L	0.10
Lead (Pb) (2)	mg/L	<0.5

Final pH of extract = 6.5

Note:

- (1) Extraction was conducted in accordance with the EP Toxicity method outlined in SW-846, except that the extraction solution used was deionized water.
- (2) Analysis by Atomic Absorption Spectrophotometry.

Comments:

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, "SW-846, Second Edition, 1984, U.S. EPA.

Analyst _

Manager Nathan Graves, K/J/C, Federal Way, WA

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 9/19/86 10/24/86

(K/J/C 6733)

Lab. No.

865595

Source

Soil I.D.:

MW-4B

TIP

Tacoma, WA

Date Collected

9/17/86

Time Collected

1307

Collected by

K/J/C

Analysis

Units

Unit

Analytical Results

pН

5.2

Lead (Pb) (2)

mg/Kg(1)<3

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst _

LP, AD

Manager .

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention

Kennedy/Jenks/Chilton

Owen Loshbough

Address 33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 9/19/86 10/24/86

(K/J/C 6733)

Lab. No.

865596

Source TIP Soil I.D.: MW-4G

Tacoma, WA

Date Collected

9/17/86

Time Collected

1402

Collected by

K/J/C

Analysis

Units

Analytical Results

Total Organic Carbon (C) (2)

mg/Kg (1) 29

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Dohrmann DC-50 Organic Carbon Analyzer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____AL

Manager Liverel

Water Analysis Report

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received

9/30/86

Reported

10/27/86 (K/J/C 6733)

Lab. No.

865782

Source

Water, MW-1

TIP

Tacoma, WA

Date Collected

9/26/86

Time Collected

1226

Collected by

K/J/C

•		, . , .	
Analysis	Units		Analytical Results
T. Copper (Cu) (1)	mg/L	0.02	
Dissolved Copper (Cu) (1)	mg/L	<0.01	
T. Lead (Pb) (1)	mg/L	0.02	
Dissolved Lead (Pb) (1)	mg/L	<0.01	

Comments:

(1) Analysis by Atomic Absorption Spectrophotometer.

Dissolved metal is defined as the fraction passing through a 0.45 micron filter.

Analyst ___

Manager

Water Analysis Report

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention

Kennedy/Jenks/Chilton

Owen Loshbough

Address 333

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received 9/

9/30/86

Reported 10/27/86

(K/J/C 6733)

Lab. No.

865783

Source

Water, MW-2

TIP

Tacoma, WA

Date Collected

9/26/86

Time Collected

1423

Collected by

K/J/C

Analysis	Units		Analytical Results
T. Copper (Cu) (1)	mg/L	<0.01	
Dissolved Copper (Cu) (1)	mg/L	<0.01	
T. Lead (Pb) (1)	mg/L	<0.01	
Dissolved Lead (Pb) (1)	mg/L	<0.01	

Comments:

(1) Analysis by Atomic Absorption Spectrophotometer.

Dissolved metal is defined as the fraction passing through a 0.45 micron filter.

Analyst ____an_

Manager

Leverett R. Smith

Kennedy/Jenks/Chilton, Laboratory Division

657 Howard Street

San Francisco, CA 94105

415-362-6065

Received 10/7/86 Reported 11/3/86

Water Analysis Report

For:

Kennedy/Jenks/Chilton

Attn:

Mr. Nathan Graves

Address:

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

(K/J/C 6738)

Lab.No.:

865998

Source:

Water, MW2

TIP

Tacoma, WA

Date Collected:

10/2/86

Time Collected:

Collected by:

K/J/C

Analysis	Units*		Analytical Results	
PURGEABLES				
Benzene	ug/L	<1		
Chlorobenzene	ug/L	<1		
1,2-Dichlorobenzene	ug/L	. <1		
1,3-Dichlorobenzene	ug/L	<1		
1,4-Dichlorobenzene	ug/L	<1		
Et hyl benzene	ug/L	<1		
Toluene	ug/L	<1		
o-xylene	ug/L	<1		
m-xylene	ug/L	<1		
p-xylene	ug/L	<1		

Comments: Analysis by EPA Method 602 (Purgeable Aromatics)

* Micrograms per liter

Analyst

SL, AL

Manager Leverett R. Sm

Water Analysis Report

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received

9/30/86

Reported 10/27/86

(K/J/C 6733)

Lab. No.

865784

Source

Water, MW-3

TIP

Tacoma, WA

Date Collected

9/26/86

Time Collected

1306

Collected by

K/J/C

Analysis	Units		Analytical Results
T. Copper (Cu) (1)	mg/L	<0.01	
Dissolved Copper (Cu) (1)	mg/L	<0.01	
T. Lead (Pb) (1)	mg/L	<0.01	
Dissolved Lead (Pb) (1)	mg/L	<0.01	

Comments:

(1) Analysis by Atomic Absorption Spectrophotometer. Dissolved metal is defined as the fraction passing through a 0.45 micron filter.

AD Analyst _

Manager _

Kennedy/Jenks/Chilton

Water Analysis Report

Laboratory Division 657 Howard Street San Francisco, California 94105

415-362-6065

For

Kennedy/Jenks/Chilton

Attention

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received

9/30/86

Reported

10/27/86

(K/J/C 6733)

Lab. No.

865785

Source

Water, MW-4

TIP

Tacoma, WA

Date Collected

9/26/86

Time Collected

1341

Collected by

K/J/C

Analysis	Units		Analytical Results
T. Copper (Cu) (1)	mg/L	<0.01	
dissolved Copper (Cu) (1)	mg/L	<0.01	
Lead (Pb) (1)	mg/L	0.01	
issolved			
Lead (Pb) (1)	mg/L	<0.01	

Comments:

(1) Analysis by Atomic Absorption Spectrophotometer.

Dissolved metal is defined as the fraction passing through a 0.45 micron filter.

Analyst ____AD

Manager

Leverett R. Smit

Kennedy/Jenks/Chilton

Water Analysis Report

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For

Kennedy/Jenks/Chilton

Attention Mr. Nathan Graves

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received

9/30/86

Reported 12/3/86

(K/J/C 6733)

Lab. No.

867785

Source

Water, MW-4

TIP

Tacoma, WA

Date Collected

9/26/86

Time Collected

1341

Collected by

K/J/C

Analysis	Units		Analytical Results
Total Zinc (Zn)	mg/L	0.05	
Dissolved Zinc (Zn)*	mg/L	0.02	
Total Cadmium (Cd)	mg/L	<0.002	
Dissolved Cadmium (Cd)*	mg/L	<0.002	

Comments:

*Dissolved metal is defined as the fraction passing through a 0.45 micron filter.

Analyst AD

Manager

Leverett R. Smith

Water Analysis Report

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received

Analytical Results

9/30/86 Reported 10/27/86

(K/J/C 6733)

Lab. No.

865780

Source

Water, CBS-04

TIP

Tacoma, WA

Date Collected

9/26/86

Time Collected

1103

Collected by

K/J/C

Analysis	Units	
T. Copper (Cu) (1)	mg/L	<0.01
Dissolved Copper (Cu) (1)	mg/L	<0.01
T. Lead (Pb) (1)	mg/L	0.02
Dissolved Lead (Pb) (1)	mg/L	0.01

Comments:

(1) Analysis by Atomic Absorption Spectrophotometer.

Dissolved metal is defined as the fraction passing through a 0.45 micron filter.

Water Analysis Report

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention

Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported

9/30/86

10/27/86

(K/J/C 6733)

Lab. No.

865779

Source

Water, CBS-05

TIP

Tacoma, WA

Date Collected

9/26/86

Time Collected

1009

Collected by

K/J/C

Analysis	Units		Analytical Results
T. Copper (Cu) (1)	mg/L	<0.01	
Dissolved Copper (Cu) (1)	mg/L	<0.01	
T. Lead (Pb) (1)	mg/L	0.02	
Dissolved Lead (Pb) (1)	mg/L	<0.01	

Comments:

(1) Analysis by Atomic Absorption Spectrophotometer.

Dissolved metal is defined as the fraction passing through a 0.45 micron filter.

Analyst ____AD_

Manager _

Leverett R. Smith

Kennedy/Jenks/Chilton

Water Analysis Report

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For

Kennedy/Jenks/Chilton

Attention

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received

9/30/86

Reported 10/27/86

(K/J/C 6733)

Lab. No.

865781

Source

Water, CBS-12

TIP

Tacoma, WA

Date Collected

9/26/86

Time Collected

1150

Collected by

K/J/C

Analysis	Units		Analytical Results
T. Copper (Cu) (1)	mg/L	<0.01	
Dissolved Copper (Cu) (1)	mg/L	<0.01	
T. Lead (Pb) (1)	mg/L	0.03	
Dissolved Lead (Pb) (1)	mg/L	<0.01	

Comments:

(1) Analysis by Atomic Absorption Spectrophotometer.

Dissolved metal is defined as the fraction passing through a 0.45 micron filter.

Analyst ____AD

Manager .

sett R. Smith

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

33301 Ninth Avenue South, Suite 100 Address

Federal Way, WA 98003

Received

9/17/86

10/28/86 Reported

(K/J/C 6733)

Lab. No.

865561

Source

Soil I.D.: SS-1

TIP

Tacoma, WA

Date Collected

9/8/86

Time Collected

1020

Collected by

K/J/C

Analysis

Units

Analytical Results

Lead (Pb) (2)

mg/Kg (1) 140,000

(1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by atomic absorption spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst _

Manager

Nathan Graves, K/J/C, Federal Way, WA

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

33301 Ninth Avenue South, Suite 100 Address

Federal Way, WA 98003

Received Reported 9/17/86 10/28/86

(K/J/C 6733)

Lab. No.

865562

Source

Soil I.D.: SS-2

TIP

Tacoma, WA

Date Collected

9/8/86

Time Collected

1026

Collected by

K/J/C

Analysis

Units

Analytical Results

Lead (Pb) (2)

mg/Kg (1) 94,000

(1) Milligrams per kilogram, wet (as received) weight basis. Comments: (2) Analysis by atomic absorption spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

AD Analyst

Manager

Nathan Graves, K/J/C, Federal Way, WA

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received

9/17/86 10/28/86

Reported 1

(K/J/C 6733)

Lab. No.

865563

Source

Soil I.D.: SS-3

TIP

Tacoma, WA

Date Collected

9/8/86

Time Collected

1029

Collected by

K/J/C

Analysis

Units

Analytical Results

Specific Gravity	-	2.1
Lead (Pb) (2)	mg/Kg (1)	120,000
Pheno1s	mg/Kg (1)	0.15
Copper (Cu) (2)	mg/Kg (1)	9400
Cadmium (Cd)	mg/Kg (1)	51
Zinc (Zn)	mg/Kg (1)	140,000
Hexavalent		
Chromium (Cr^{+6})	mg/Kg (1)	<0.05
Sulfides (S=)	mg/Kg (1)	<0.1
Cyanide (CN)	mg/Kg (1)	<1

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by atomic absorption spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst AD, LP, TK, RS

Manager

ager Leverett R. Smith

cc: Nathan Graves, K/J/C, Federal Way, WA

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362 6065

For Attention Kennedy/Jenks/Chilton

Nathan Graves

33301 Ninth Avenue South, Suite 100 Address

Federal Way, WA 98003

Received Reported 9/17/86 12/2/86

(K/J/C 6733)

Lab. No.

865563

Source

Soil I.D.: SS-3

TIP

Tacoma, WA

Date Collected

9/8/86

Time Collected

1029

Collected by

K/J/C

Analysis	Units		
Barium (Ba)(2)	mg/Kg	(1)	<3
T. Chromium (Cr)(2)	mg/Kg		11
Mercury (Hg)(2)	mg/Kg	(1)	0.56
Nickel (Ni)(2)	mg/Kg	(1)	250
Selenium (Se)(2)	mg/Kg	(1)	<0.3
Silver (Ag)(2)	mg/Kg	(1)	9.1
Thallium (T1)(2)	mg/Kg	(1)	<3

Analytical Results

(1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst _

Manager

RP Toxicity Analysis Report

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention

Address

Kennedy/Jenks/Chilton

Owen Loshbough

33301 Ninth Avenue South, Suite 100 Federal Way, WA 98003

Received Reported 9/17/86 10/28/86

(K/J/C 6733)

Lab. No.

865563

Source

Soil I.D.: SS-3

TIP

Tacoma, WA

Date Collected

9/8/86

Time Collected

1029

Collected by

K/J/C

Contaminant	Units	Concentration in Extract (1)
Cadmium (Cd) (2)	mg/L	0.14
Copper (Cu) (2)	mg/L	0.04
Zinc (Zn) (2)	mg/L	64
Lead (Pb) (2)	mg/L	1.6

Final pH of extract = 5.9

Note:

- (1) Extraction was conducted in accordance with the EP Toxicity method outlined in SW-846, except that the extraction solution used was deionized water.
- (2) Analysis by Atomic Absorption Spectrophotometry.

Comments:

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, "SW-846, Second Edition, 1984, U.S. EPA.

Analyst _____

Manager Zevel

cc: Nathan Graves, K/J/C, Federal Way, WA

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415 362 6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 10/23/86 10/31/86

(K/J/C 6733)

Lab. No.

867357

Source TIP Soil I.D.: SS-5

Depth: Surface

Tacoma, WA

Date Collected

10/17/86

Time Collected

1441

Collected by

K/J/C

Analysis

Units

Analytical Results

Lead (Pb) (2)

mg/Kg (1) 35,000

Copper (Cu) (2)

mg/Kg (1) 93,000

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by atomic absorption spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ___AD

Manager

tt R. Smith

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention

Kennedy/Jenks/Chilton

Owen Loshbough

Address 33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received 9 Reported 10

9/17/86 10/28/86

(K/J/C 6733)

Lab. No.

865555

Source

Sample I.D.:

Wall

TIP Tacoma, WA (from wall of

building)

Date Collected

9/15/86

Time Collected

0810

Collected by

K/J/C

Analysis

Units

Analytical Results

Lead (Pb) (2)

mg/Kg (1) 150,000

Copper (Cu) (2)

mg/Kg (1) 340,000

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____AD_

so informed of the contents hereof,

Manager

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415 362 6065

For Attention

Kennedy/Jenks/Chilton

Owen Loshbough

Address 33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 9/17/86 10/28/86

(K/J/C 6733)

Lab: No.

865556

Source

Soil I.D.: Slope

TIP

Tacoma, WA

Date Collected

9/15/86

Time Collected

0845

Collected by

K/J/C

Analysis

Units

Analytical Results

Lead (Pb) (2)

mg/Kg (1) 64,000

Copper (Cu) (2)

mg/Kg (1) 410,000

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____AD

. Manager

Leverett R. Smith

cc: Nathan Graves, K/J/C, Federal Way, WA

Kennedy/Jenks/Chilton

Laboratory Division

657 Floward Street San Francisco, California 94105 415 362 6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 10/23/86 10/31/86

(K/J/C 6733)

Lab. No.

867358

Source TIP Soil I.D.: TP-1

Dept

Depth: 5 ft

Tacoma, WA

Date Collected

cted

Time Collected

K/J/C

Collected by

Analysis

Units

Analytical Results

Lead (Pb) (2)

mg/Kg (1) 810

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by atomic absorption spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____AD_

so informed of the contents hereof,

Manager

CC: Nathan Graves, K/J/C, Federal Way, WA. This report applies only to the sample modificated and is not necessardy indicative of the quality of apparently identical or similar samples. The liability of the laboratory is limited to the amount paid for the report by the issuee. The issuee assumes all hability for the further distribution of this report or its contents and by making such distribution agrees to hold the laboratory harmless against all claims of persons

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address 33301 Ninth Avenue South, Suite 100 Federal Way, WA 98003

Received Reported

Analytical Results

10/23/86 10/31/86

(K/J/C 6733)

Lab. No.

867365

Source TIP Soil I.D.: TP-5

Depth: 4.5 ft

Tacoma, WA

Date Collected

Time Collected

K/J/C

Collected by

Analysis
Lead (Pb) (2)

mg/Kg (1) 89

Units

Copper (Cu) (2)

mg/Kg (1) 230

Cadmium (Cd) (2)

mg/Kg (1) <0.05

Zinc (Zn) (2)

mg/Kg (1) 150

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by atomic absorption spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW—846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ___AD

Manager ₋

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received

10/23/86

10/31/86 Reported

(K/J/C 6733)

Lab. No.

867366

Source

Soil I.D.: TP-6

TIP

Depth: 3-4 ft

Tacoma, WA

Date Collected

Time Collected

Collected by

K/J/C

Analysis

Units

Analytical Results

Lead (Pb) (2)

mg/Kg (1) 350

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by atomic absorption spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst .

Manager _

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415 362 6065

For

Kennedy/Jenks/Chilton

Attention Nathan Graves

Address 33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received

10/23/86

Reported 12/2/86

(K/J/C 6733)

Lab. No.

867366

Source

urce TP-

Tacoma, WA

TP-6 Depth 3-4 ft

Date Collected

10/17/86

Time Collected

-

Collected by

K/J/C

Analysis

Units

Analytical Results

T. Zinc (Zn)

mg/Kg

2200

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste – Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____A

Manager

ly indicative of the quality of apparently identical or similar sa

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94t05 415 362-6065

For Attention Kennedy/Jenks/Chilton

Nathan Graves

33301 Ninth Avenue South, Suite 100 Address

Federal Way, WA 98003

10/23/86 Received

12/2/86 Reported

Quality Control Page (K/J/C 6733)

Lab. No.

867366

Source

TP-6

TIP

Depth 3-4 ft

Tacoma, WA

Date Collected

10/17/86

Time Collected

Collected by

K/J/C

Analysis

Units

Replicate **Analytical Results**

T. Zinc (Zn)

mg/Kg

2300

2006

Spike recovery 74%

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Manager

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415 362 6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received

Analytical Results

10/23/86

10/31/86 Reported

(K/J/C 6733)

Lab. No.

867359

Source TIP Soil I.D.: TP-9

Depth:

5.5 ft

Tacoma, WA

Date Collected

Time Collected

K/J/C

Collected by

Analysis Units

> mg/Kg (1) 110

Copper (Cu) (2)

Lead (Pb) (2)

mg/Kg (1) 140

Cadmium (Cd) (2)

mg/Kg (1) <0.04

Zinc (Zn) (2)

mg/Kg (1) 73

(1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by atomic absorption spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____AD___

Manager

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415 362 6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address 33301 Ninth Avenue South, Suite 100 Federal Way, WA 98003

10/27/86 Received 10/28/86 Reported

(K/J/C 6733)

Lab. No.

867513

Source

Soil I.D.: TP-13

TIP

Tacoma, WA

Date Collected

10/24/86

Time Collected

1440

Collected by

K/J/C

Analysis

Units

Analytical Results

Lead (Pb) (2)

mg/Kg (1) 52

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by Atomic Absorption Spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst __

Manager

cc: Nathan Graves, K/J/C, Federal Way, WA
This report applies only to the sample investigated and is not necessarily indicative of the quality of apparently identical or similar samples. The hability of the laboratory is limited to the amount paid for the report by the issuee. The issuee assumes all liability for the further distribution of this report or its contents and by making such distribution agrees to hold the laboratory harmless against all claims of persons so informed of the contents hereof,

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention

Kennedy/Jenks/Chilton

on Owen Loshbough

Address 33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received

10/23/86

Reported

10/31/86

(K/J/C 6733)

Lab. No.

867364

Source TIP Soil I.D.: TP-16

Depth: 1.5 ft

Tacoma, WA

Date Collected

_

Time Collected

K/J/C

Collected by

Analysis

Analytical Results

Lead (Pb) (2)

mg/Kg (1) 8.8

Units

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by atomic absorption spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste – Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____AD

Manager ZhverM R. Smith
WA

cc: Nathan Graves, K/J/C, Federal Way, WA
This report applies only to the sample investigated and is not necessarily indicative of the quality of apparently identical or similar samples. The hability of the laboratory is limited to the amount paid for the report by the issuee. The issuee assumes all liability for the further distribution of this report or its contents and by making such distribution agrees to hold the laboratory harmless against all claims of persons so informed of the contents hereof.

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 10/23/86 10/31/86

(K/J/C 6733)

Lab. No.

867362

Source TIP Soil I.D.:

Depth:

TP-20 0-3 ft

Tacoma, WA

Date Collected

Time Collected

K/J/C

42

Collected by

Zinc (Zn) (2)

Analysis	Units	
Lead (Pb) (2)	mg/Kg (1)	240
Copper (Cu) (2)	mg/Kg (1)	90
Cadmium (Cd) (2)	mg/Kg (1)	<0.04

mg/Kg (1)

Analytical Results

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by atomic absorption spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____

so informed of the contents hereof,

Manager

cc: Nathan Graves, K/J/C, Federal Way, WA
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Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received

10/23/86

10/31/86 Reported

(K/J/C 6733)

Lab. No.

867363

Source TIP Soil I.D.: TP-20

Depth: 7-9 ft

Tacoma, WA

Date Collected

Time Collected

K/J/C

Collected by

Analysis

Units

Analytical Results

Lead (Pb) (2)

mg/Kg (1) 3.1

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by atomic absorption spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst _

Manager

cc: Nathan Graves, K/J/C, Federal Way, WA
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Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415 362 6065

For Attention Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 10/23/86 10/31/86

(K/J/C 6733)

Lab. No.

867360

Source TIP Soil I.D.: TP-30

2-3 ft Depth:

Tacoma, WA

Date Collected

Time Collected

K/J/C

Collected by

Analysis

Units

Analytical Results

Lead (Pb) (2)

mg/Kg (1)

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by atomic absorption spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

AD Analyst _

Manager _

Nathan Graves, K/J/C, Federal Way, WA This report applies only to the sample investigated and is not necessarily indicative of the quality of apparently identical or similar samples. The liability of the laboratory is limited to the amount paid for the report by the issuee assumes all liability for the further distribution of this report or its contents and by making such distribution agrees to hold the laboratory harmless against all claims of persons so informed of the contents hereof,

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415 362 6965

For Attention

Kennedy/Jenks/Chilton

Owen Loshbough

Address

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 10/23/86 10/31/86

(K/J/C 6733)

Lab. No.

867361

Source TIP Soil I.D.:

Depth:

TP-30 3.5-4.5 ft

Tacoma, WA

Date Collected

Time Collected

Collected by

_

K/J/C

Analysis

Units

Analytical Results

Lead (Pb) (2)

mg/Kg(1) 2.0

Comments: (1) Milligrams per kilogram, wet (as received) weight basis. (2) Analysis by atomic absorption spectrophotometer.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst _____

AD

Manager

cc: Nathan Graves, K/J/C, Federal Way, WA

This report applies only to the sample investigated and is not necessarily indicative of the quality of apparently identical or similar samples. The liability of the laboratory is limited to the amount paid for the report by the issuee. The issuee assumes all liability for the further distribution of this report or its contents and by making such distribution agrees to hold the laboratory harmless against all claims of persons so informed of the contents hereof.

Analysis Report

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Address Kennedy/Jenks/Chilton

Mr. Nathan Graves
33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 10/28/86 11/4/86

(K/J/C 6733)

Lab. No.

867539

Source TIP Wood Block Sample #1 (1)

Tacoma, WA

Date Collected

10/27/86

Time Collected

Collected by

K/J/C

Analysis

Units

Analytical Results

Total Lead (Pb)*

mg/Kg (2) 650

Total Copper (Cu)* mg/Kg (2) 36

Note:

(1) In accordance with Mr. Nathan Graves' instructions, wood block submitted was analyzed as follows:

Approximately 2 inches of the wood were cut off the top side (dusty side), divided into 3 pieces, identified as samples Nos. 1, 2 and 3. Sample No. 1, which included dust, was cut into two pieces and one piece of wood was analyzed for total lead and copper as shown above.

(2) Milligrams per kilogram, wet (as received) weight basis.

Comments: Analysis by atomic absorption spectrophotometry.

Reference: "Test Methods for Evaluating Solid Waste – Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Al

so informed of the contents hereof,

Analyst ______

Manage

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BP Toxicity Analysis Report

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention

Kennedy/Jenks/Chilton Mr. Nathan Graves

Address 33301 Ninth Avenue South, Suite 100 Federal Way, WA 98003

Received Reported 10/28/86 11/4/86

(K/J/C 6733)

Lab. No.

867539

Source TIP Wood Block Sample #1 (1)

Tacoma, WA

Date Collected

10/27/86

Time Collected

_

Collected by

K/J/C

Contaminant	Units	Concentration in Extract
Lead (Pb)*	mg/L	8.7
Copper (Cu)*	mg/L	21

Final pH of extract = 3.4

Note:

(1) In accordance with Mr. Nathan Graves' instructions, wood block submitted was analyzed as follows:

Approximately 2 inches of the wood were cut off the top side (dusty side), divided into 3 pieces, identified as samples Nos. 1, 2 and 3. Sample No. 1, which included dust, was cut into two pieces and one piece of wood was analyzed for lead and copper in E.P. Toxicity extract as shown.

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Analysis Report

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention

Kennedy/Jenks/Chilton Mr. Nathan Graves

Address 33301 Ninth Avenue South, Suite 100 Federal Way, WA 98003

Received Reported 10/28/86 11/4/86

(K/J/C 6733)

Lab. No.

867539

Source TIP Wood Block Sample #2 (1)

Tacoma, WA

Date Collected

10/27/86

Time Collected

Collected by

K/J/C

Analysis

Units

Analytical Results

Total Lead (Pb)*

mg/Kg (2) 36

Total Copper (Cu)* mg/Kg (2) 28

Note:

(1) In accordance with Mr. Nathan Graves' instructions, wood block submitted was analyzed as follows:

Approximately 2 inches of the wood were cut off the top side (dusty side), divided into 3 pieces, identified as sample Nos. 1, 2 and 3. Sample No. 2 was freed of dust with a vacuum cleaner, then cut into two pieces. One vacuumed piece of wood was analyzed for total lead and copper as shown above.

(2) Milligrams per kilogram, vacuumed wood weight basis.

Comments: Analysis by atomic absorption spectrophotometry.

Reference: "Test Methods for Evaluating Solid Waste — Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Analyst ____AI

Manager

R. Smith

This report applies only to the sample investigated and is not necessarily indicative of the quality of apparently identical or similar samples. The liability of the laboratory is limited to the amount paid for the report by the issuee. The issuee assumes all liability for the further distribution of this report or its contents and by making such distribution agrees to hold the laboratory harmless against all claims of persons so informed of the contents hereof.

EP Toxicity Analysis Report

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Address Kennedy/Jenks/Chilton
Mr. Nathan Graves

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported 10/28/86 11/4/86

(K/J/C 6733)

Lab. No.

867539

Source TIP Wood Block Sample #2 (1)

Tacoma, WA

Date Collected

10/27/86

Time Collected

Collected by

K/J/C

Contaminant	Units	Concentration in Extract
Lead (Pb)*	mg/L	1.3
Copper (Cu)*	mg/L	2.3

Final pll of extract = 3.3

Note:

(1) In accordance with Mr. Nathan Graves' instructions, wood block submitted was analyzed as follows:

Approximately 2 inches of the wood were cut off the top side (dusty side), divided into 3 pieces, identified as samples Nos. 1, 2 and 3. Sample No. 2 was freed of dust with a vacuum cleaner, then cut into two pieces. One vacuumed piece of wood was analyzed for lead and copper in E.P. Toxicity extract as shown.

Comments:	*Analysis by atomic absorption spectrophotometry.
Reference: SW-846, Se	"Test Methods for Evaluating Solid Waste - Physical/Chemical Methods," cond Edition, 1984, U.S. EPA.
Analyst	Manager Leverett R. Smith

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EP Toxicity Analysis Report

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention

Address

Kennedy/Jenks/Chilton Mr. Nathan Graves

33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received

10/28/86

Reported 12/3/86

(K/J/C 6733)

Lab. No.

867539

Source TIP Wood Block Sample #2 (1)

Tacoma, WA

Date Collected

10/27/86

Time Collected

K/J/C

Collected by

Contaminant	Units	Concentration in Extract (1)	
Contaminant	ULLES	Concentration in Extract (1)	
Arsenic (As)	mg/L	<0.01	
Barium (Ba)	mg/L	<0.01	
Cadmium (Cd)	mg/L	<0.01	
Chromium (Cr)	mg/L	<0.05	
Mercury (Hg)	mg/L	<0.002	
Selenium (Se)	mg/L	<0.01	
Silver (Ag)	mg/L	<0.01	

Note:

(1) In accordance with Mr. Nathan Graves' instructions, wood block submitted was analyzed as follows:

Approximately 2 inches of the wood were cut off the top side (dusty side), divided into 3 pieces, identified as sample Nos. 1, 2 and 3. Sample No. 2 was freed of dust with a vacuum cleaner, then cut into two pieces. One vacuumed piece of wood was analyzed for lead and copper in E.P. Toxicity extract as shown.

Comments: Analysis by atomic absorption spectrophotometry.

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods," SW-846, Second Edition, 1984, U.S. EPA.

Analyst ____TK, AD

so informed of the contents hereof.

Manager .

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Analysis Report

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton Mr. Nathan Graves

Address 33301 Ninth Avenue South, Suite 100

Federal Way, WA 98003

Received Reported

10/28/86 11/4/86

(K/J/C 6733)

Lab. No.

867539

Source

TIP

Wood Block Sample #3 (1)

Date Collected

Tacoma, WA

10/27/86

Time Collected

Collected by

K/J/C

Analysis

Units

Analytical Results

Total Lead (Pb)*

mg/Kg (2) 26

Total Copper (Cu)* mg/Kg (2) 44

Note:

(1) In accordance with Mr. Nathan Graves' instructions, wood block submitted was analyzed as follows:

Approximately 2 inches of the wood were cut off the top side (dusty side), divided into 3 pieces, identified as sample Nos. 1, 2 and 3. Sample No. 3 was washed with hot water, then cut into two pieces. One washed piece of wood was analyzed for total lead and copper as shown above.

(2) Milligrams per kilogram, wet (as received) weight basis.

Comments: Analysis by atomic absorption spectrophotometry.

Reference: "Test Methods for Evaluating Solid Waste -- Physical/Chemical Methods", SW-846, Second Edition (Revised 1984), and "California Administrative Code Title 22, Div. 4".

Manager

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so informed of the contents hereof.

EP Toxicity Analysis Report

Kennedy/Jenks/Chilton

Laboratory Division

657 Howard Street San Francisco, California 94105 415-362-6065

For Attention Kennedy/Jenks/Chilton

Mr. Nathan Graves

Address

33301 Ninth Avenue South, Suite 100 Federal Way, WA 98003

Received Reported 10/28/86 11/4/86

(K/J/C 6733)

Lab. No.

867539

Source TIP

Wood Block Sample #3 (1)

Tacoma, WA

Date Collected

10/27/86

Time Collected

Collected by

K/J/C

Contaminant	Units	Concentration in Extract
Lead (Pb)*	mg/L	<0.5
Copper (Cu)*	mg/L	0.58

Final pH of extract = 3.5

Note:

(1) In accordance with Mr. Nathan Graves' instructions, wood block submitted was analyzed as follows:

Approximately 2 inches of the wood was cut off the top side (dusty side), cut into 3 pieces and identified as sample Nos. 1, 2 and 3. Sample No. 3 was washed with hot water and cut into 2 pieces. I washed piece of wood was analyzed for lead and copper in E.P. Toxicity extract as shown above.

*Analysis by atomic absorption spectrophotometry. Comments:

Reference: "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods," SW-846, Second Edition, 1984, U.S. EPA.

Analyst __

Manager

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TVA Thermo Analytical Inc.

TMA/EAL

2030 Wright Avenue

Richmond, CA 94804-0040

(415) 235-2633 (TWX) 910-382-8132

ANALYSIS REPORT

KENNEDY/JENKS/CHILTON

33301 9TH SO. FEDERAL WAY

WASHINGTON, 98031

ATTN: OWEN LOSHBOUGH

DATE: 10-6-86 Samples Received: 9-19-86

EAL W.O. No. 4602-4

Purchase Order No. 6733

 SAMPLE IDENTIFICATION		LEAD	
EAL	CUSTOMER	uq/f	······································
4602-4-1	A-1	<1	
4602-4-2	A-2	<1	
4602-4-3	A-3	<1	
4602-4-4	A-4	<1	
4602-4-5	A-5	8	
4602-4-6	B-1	<1	•
4602-4-7	B-2	<1	
4602-4-8	B-3	<u> </u>	
4602-4-9	B-4	<u>(1</u>	
4602-4-10	B-5	3	
4602-4-11	C-0	(1	

HYG/1tm

Harry Gee Program Manager

APPENDIX D

SUPPORTING DATA - INITIAL REMEDIAL MEASURE



GENERALORS WASTE PRODUCT QUESTIONNAIRE
Envirosafe Services of Idaho, Inc.
P.O. Box 417, Boise, Idaho 83701
Phone (208) 384-1500

	BI, INC. USE ONLY
ESI ID NO.	
REGION	

I. GENERAL INFORMATION Generator Name TIP Management In	<u>. </u>	Generator U.S. Ef	PA 10W/ <u>A/D/1/8/0/8/3/C/2/C</u>	16
Facility Address 5202 South Proctor				
1) dima w A	1 /		1) 511	_
Technical Contact Nother Craves Kinnedy	Dehke / h. Hen_ P		374.0555°	
Broker/Business Contact Turner 1: And C		hone () 0 (·)	353-3545	=
II. WASTE PRODUCT DESCRIPTION & CHARACTERISTICS A. Waste Product Common Name Lead Control	munded Soil	/slog		
Process Generating Waste	4.000.0950	/		—
B. Hazardous Properties: 1. U.S. EPA Hazardous Material? Yes No	2. U.S. EPA Ha	zardous Code(s):_	N008	
c. Is Waste Product: ☐ Explosive ☐ Reactive C. Physical Properties at 70°F:	☐ Radioactive ☐	Pyrophoric	☐ Etiological ☐ Shock Sensit	ive
1. Physical State: 2. Layers:	· 3. Flash Po	Int (Closed Cup	Only): 4. Viscosity:	
⊡ Solid □ Sludge □ Multilaye			0-200°F Similar to:	
☐ Liquid ☐ Powder ☐ Bi-Layere	d 🗆 70-10	0°F Œ No	Flash	
Any free liquids at 70°F ☑ Homoger	nous 🗆 101-1	39°F □ Exa	act	
☐ Yes ☐ No			☐ Honey . ,	
D. 1. Density: 2. Solid	s: 3. Odor:	4. Ph.	. ⊡ Other <u>Scloo</u>	<u></u>
	Weight	()<	<2 □ 9.1 - 12,5	
	Volume . Stron	g 🗆	2 - 5 □>12.5	
Any debris in waste: Total	100 /0 D Mild	டூ	5.1 - 9	
☐ Yes ☑ No	Describe	:		
Explain				
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- Havy Mileto		tal (PPM)	Endrin	
Fill / Start / Slag 7		A Extraction Pro	cedure Lindane	
<u> </u>		g/L) 人().1	Methoxychlor	
			Toxaphene	
	% Cadmium			
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		Q (')	Non Present	
	Lead (Pb)			_
	Selenium	(Se) < (), 1	Reactives & Other	-
	Silver (Ag)	< ()	Wastes (PPM):	
	Non Pres		Cyanides Dioxin	
	- 04		Sulfides Other	
F. Shipping and Handling Information:			No R	
	er D.O.T. Shipping Name:	Hazirdous	waste, Solid, N.O.S	
1. D.O.T. Hazardous Material? Yes No 2. Property No. 2. Property No. 2. D.O.T. ID Number: NA 9157	D.O.T. Hazard Class:	ORK	1.1	
			1	بأبيدا وسيأ
5. Method of Shipment:Drum and/orBulk _				Total Harrie
7. Projected Volume:TonsGall				
Per One Time Week	Month	Quarter	Year	1
Comments: Makeul must be disposed 1	n adouble lined co	(d, ediquble t	recieve CERCLII WO	<u>w</u> ye.
III. GENERATOR CERTIFICATION STATEMENT I hereby certify that as an authorized representative of t documents is true and accurate. Analysis of the waste w representative sample as defined in 40 CFR 261.20. To t ponents have been included it this documentation. All m Signature	as conducted in accordar he best of my knowledge	ice with the appro all known (40 CF comply with all c	oved test methods in 40 CFR 261 or	n a
Oignature -			Date 11/41/50	_
	ESI, INC. USE ONLY	I Bata Ball		 -
Reviewed by:	Date Approved:	Date Denied:	Clessification:	
Treatment:		1	WDS Code:	_
				1

Page INDUSTRIAL WASTE D. O. NUMBER MATERIAL Envirosafe Services of Idaho, Inc. 2520 DISPOSAL ORDER P.O. BOX 936 **MOUNTAIN HOME, IDAHO 83647** December 12, 1986 TELEPHONE (208) 587-8434 DATE: GENERATOR NO. THIS NUMBER MUST APPEAR ON ALL CONTAINERS, BILLS OF LADING, MANIFESTS AND CORRESPONDENCE. ACCOUNT NO. TIP Management, Inc. Same 5202 South Proctor St. Tacoma, WA "GENERATOR" "PLANT" TIMATED DELIVERY/SHIP DATE FACILITY ADDRESS: To be Scheduled ESI, Inc. 10.5 NW of Grandview, Idaho 83624 GENERATOR CONTACT AND TELEPHONE NO. GENERATOR EPA ID NO. Thomas R. Ande rson 206-383-3545 WAD 980 836 266 RANSPORTER EPA ID NO. FACILITY EPA ID NO. Transportation to be provided by generator IDD 073 114 654 DOT ESTIMATED **GENERAL DESCRIPTION OF** ITEM # UNIT DISPOSAL WASTE ID # WASTE ID # QUANTITY INDUSTRIAL WASTE MATERIAL PRICE 1 D008 NA9189 10 yrds Lead Contaminated Soil WPQ #: 0125T-X \$ 100.00/ton Idaho State Hazardous Waste Tax 0.01/1bCashiers Check to accomplany the load for \$1,200.00. Idaho State Hazardous Waste Trip Permit fee of \$20.00/truckload must be paid by each vehicle priior to receipt of material at ESII. Transporter must comply with ESII routing and scheduling as per the ESII Compliance Manual. REFER ALL INQUIRIES AND CORRESPONDENCE ALL PRICING QUOTED HEREIN SHALL REMAIN FIRM FOR NINETY (90) DAYS RELATIVE TO THIS ORDER TO ATTENTION OF FROM THE DATE HEREOF; THEREAFTER QUOTED PRICING IS SUBJECT TO CHANGE. **ACKNOWLEDGEMENT** Russ Smith GENERATOR HEREBY ACKNOWLEDGES ACCEPTANCE OF THIS DISPOSAL SALES REPRESENTATIVE ORDER, GENERATOR HAS READ THE TERMS AND CONDITIONS APPEARING ON THE REVERSE SIDE OF THIS DISPOSAL ORDER AND AGREES TO BE OR ENVIROSAFE SERVICES OF IDAHO, INC. BOUND BY THE PROVISIONS THEREOF.

SII005 o Envirosafe services, inc. 1984

Vice President & General Mgr.

CROWLEY ENVIRONMENTAL SERVICES CORP. 9400 E. Marginal Way 8. Soattle, WA 98131 208-682-4898

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	UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator's US	EPA ID No. 5.8.36-2	. 6 6 0.0.	anifest ment No	2. Pag	ge 1 Informa not requ	tion in the vired by Fo	shaded ar ederal law.	eas i
	3. Generator's Name and Mailing Address T. J. P. Milan M. Enlant, 1.	•				A. Sta	te Manifest Docu	ment Num	ber .	3.5
1	CC27 (M2 2 Post)	<u></u> .		: ~01				<u> </u>	
	CS2237 1123 Pour et 7 4. Generator's Phone (706) 284 90	TACOMA FOR	A, IACE	mA IUA	1800 c	B. Sta	te Generator's ID) () () () () () () () () () (
	5. Transporter 1 Company Name	6		PA ID Number		C. Sto	te Transporter's I	D		1 11
	DAAT TRUKKING INC.	<u>k</u>		1865 8	25.		nsporter's Phone		33290	41
	7. Transporter 2 Company Name	8	. US E	PA ID Number		E. Sta	te Transporter's II) .	e de la companya del companya de la companya del companya de la co	ીં હતું છે.
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	Ir. S NW OF GAMOVIEW	T/)Arre	[.0.5.C.	7.3.114.6	54.		illity's Phone	84	34	
	11. US DOT Description (Including Proper Shipping	g Name, Hazard Class	s, and ID Numbe	r)	12. Cont No.	Type	13. Total Quantity	14. Unit Wt/Vol	l. Waste l	No.
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	ϵ	CARCLA	+ Winte				\			
	16. GENERATOR'S CERTIFICATION: A Schoby declar marked, and labeled, and are in all dispecting proper	re that the contents of the	is consignment are	fully and accurate	ely described	above b	y proper shipping n	ame and ar	e classified, p	acked.
	Unless I am a small quantity generator who has been e									certifi
	that I have a program in place to reduce the volume treatment, storage, or disposal currently available	and toxicity of waste g	enerated to the d	egree I have deter	rmined to be	economi	ally practicable an	d I have sel	ected the met	hod of
$ \downarrow $	Printed/Typed Name Thornas R. Anderso	on Presid	Signatur	Manas	17	The s	lum		2 1 Pox	32
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Ì	20. Facility Owner or Operator: Certification of rec	cerpt of nazardous m	areriais covered	by this manifest	except as	noted in	I ITEM 19.			
Ť	Printed/Typed Name		Signatur					M	onih Day	Yea
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- Z	三、····································					E:	W. Charles T. Barrell		30 Carrier 18	1.180

TIP MANAGEMENT, INC. CS 2259 1123 Port of Tacoma Road Tacoma, WA 98401

5 January 1987

Envirosafe Services of Idaho, Inc. P. O. Box 417

Boise, ID 83701

Attention: Ms. Carol Price

Subject: Correction to Uniform Hazardous Waste Manifest

D.O. Number 2520 WPO#: 0125T-X

Dear Ms. Price:

With regard to the uniform hazardous waste manifest identified below:

Generators ID No.

WAD 980836266

Manifest Document No.

00001

D.O. Number

2520

WPQ#:

0125T-X

Please note the following corrections:

Item H - Facility's Phone. This number should be changed to "208-834-2275".

Item 12 - Containers, Type. This entry should be changed to "DT".

Item 13 - Total Quantity. This entry should be changed to "20,660".

Item 14 - Unit, Wt/vol. This entry should be "LBS".

We understand that you have already corrected the manifest to reflect these changes/additions.

Please call1 us at (206) 383-3545 if you have any questions.

Very truly yours,

TIP MANAGEMENT, INC.

MMus / Miderson

President

APPENDIX E

AQUATIC FATE AND MOBILITY OF SELECTED COMPOUNDS

APPENDIX E

AQUATIC FATE AND MOBILITY OF SELECTED COMPOUNDS 1

Arsenic

The fate of arsenic in the aquatic environment is complex, depending on a number of factors including Eh, pH, metal sulfide and sulfide ion concentrations, presence of phosphorus minerals, iron concentration, temperature, salinity, and distribution and composition of the biota. It appears that, in most cases, the sediment is the major sink for arsenic, but that mobilization by bacteria and other benthic organisms returns much of this arsenic to the cycle. Much, if not most, of the arsenic introduced to the aquatic ecosystem is eventually transported in solution to the oceans.

Lead

Sorption processes are effective in reducing the concentration of soluble lead in natural water and result in enrichment of bed sediments near the source. The equilibrium solubility of lead with carbonate, sulfate, and sulfide is low. In severely contaminated areas, precipitation may be important in controlling the mobility of this metal, but under most circumstances, sorption predominates. The tendency for lead to form complexes with naturally occurring organic materials (e.g., humic and fulvic acids) increases its adsorptive affinity for clays and other mineral surfaces. Bioaccumulation of weakly sorbed lead phases may result in remobilization. Lead is generally not biomagnified; bioconcentration factors tend to decrease as the trophic level increases.

Zinc

Most of the zinc introduced into the aquatic environment is partitioned into the sediments by sorption onto hydrous iron or manganese oxides, clay minerals, and organic materials. The efficiency of these materials in removing zinc from solution varies according to their concentrations, pH, Eh, concentrations of ligands, and the concentration of zinc. Precipitation of the sulfide is an important control on the mobility of zinc in reducing environments. Under aerobic conditions, precipitation of zinc compounds is probably important only where zinc is present in high concentrations. Zinc is bioaccumulated, which is to be expected in view of the fact that it is an essential nutrient. Although the biota appear to be a minor reservoir of zinc relative to the sediments, biological activity can affect the mobility of zinc in the aquatic environment.

From "Water-Related Environmental Fate of 129 Priority Pollutants", EPA - 440/4-79-029 a, b, 1979

Copper

Copper exhibits a very complex behavior in the aquatic environment. Sorption processes are probably most important in controlling copper distribution and include: coprecipitation/sorption by hydrous iron and manganese oxides; ion exchange in the crystal lattice structure of carbonate minerals; adsorption to clays and other mineral surfaces; and adsorption to organic solids. Sorption appears to be more important than precipitation in most circumstances.

Both organic and inorganic ligands complex copper. Under normal conditions, most of the copper in solution is in complexed form. These complexes alter the behavior of copper to the extent that it is generally more soluble in natural waters than would be predicted by conventional analysis employing thermodynamic equilibria, and it has a greater adsorptive affinity for hydrous solids than uncomplexed forms.

Cadmium

Cadmium is mobile in the aquatic environment relative to most other heavy metals. It occurs as the divalent metal cation in acidic and circumneutral water, and it forms complexes with organic material in highly polluted waters and complexes with carbonate and hydroxide ions at higher pH values. The formation of complexes with humic substances is important because these complexes are more easily assimilated by the sediments than the hydrated divalent cation. Sorption processes are the most important factor in reducing the aquatic load and transport velocity of cadmium. Cadmium is less mobile in alkaline than in acidic waters. Sorption to organic materials and clay minerals, co-precipitation with hydrous metal oxides and substitution in carbonate minerals all affect the distribution and fate of cadmium. Cadmium, although highly toxic, is concentrated by all organisms.

APPENDIX F

TOXICOLOGY OF SELECTED COMPOUNDS

APPENDIX F

TOXICOLOGY OF SELECTED COMPOUNDS

Arsenic

Arsenic is a naturally occurring element often referred to as a metal, although chemically classified as a metalloid.

The typical systemic manifestations of arsenic poisoning due to ingestion usually include gastrointestinal disturbances. Death, which is generally preceded by restlessness, convulsions, or coma, may result from cardiac failure. In subacute poisoning, symptoms are less intense. Although few human epidemiologic studies have provided evidence of arsenic-induced reproductive or teratogenic effects, several studies have shown that sodium arsenate induces several developmental malformations in embryo chicks, hamsters, rats and mice.

Arsenic compounds have caused chromosomal damage in a number of biological systems, alerting toxicologists to the possibility of arsenicinduced mutagenesis.

There is evidence that inorganic arsenic is a skin carcinogen in man (EPA 1980a) and significant evidence that it is a lung carcinogen.

Lead

Lead occurs ubiquitously in the environment. Surface waters worldwide contain lead at low concentrations in the range of 1 to 10 ug/L. Lead can enter drinking water distribution systems in areas where highly acidic water with low hardness and alkalinity dissolve lead from rocks in aquifers or from lead pipes and fittings. The dietary contribution of lead is approximately 200 ug/day for adults and 40 to 200 ug/day for children (aged three months to nine years). Lead concentrations in ambient air ranges from about 0.1 ug/m 3 in rural areas to 10 ug/m 3 in areas of heavy traffic (EPA, 1980b).

Lead is accumulated in the human body; however, the amount of lead that can be tolerated without eliciting adverse effects has not been established. Acute symptoms of lead poisoning include a burning sensation in the mouth, severe thirst, inflammation of the gastrointestinal tract accompanied with vomiting and diarrhea (Sittig, 1981). Chronic exposure to lead can result in the loss of appetite, nausea, vomiting, severe abdominal pain, paralysis, mental confusion, visual disturbances, anemia, and convulsions (Sittig, 1981).

There is a lack of scientific evidence to show that lead is a teratogenic, mutagenic, or carcinogenic agent in humans (EPA 1980b).

Zinc

Zinc metal occurs in nature in the sulfide, oxide, or carbonate forms (Sittig, 1981). It is an essential nutrient for human and animal metabolism; an acceptable daily intake for zinc in food has not been established. Based on organoleptic effects, the secondary drinking water standard for zinc has been established at 5.0 mg/L. At zinc levels of 5.0 mg/L or greater, a bitter taste is detected by some people. Zinc is not considered a carcinogenic agent. Studies on experimental animals and humans administered with zinc therapeutically and exposed to zinc occupationally, indicate that it can be tolerated over a long period of time. The most commonly reported effect of high-level exposure is interference with copper metabolism, resulting in a reversible copper deficiency condition. There is an inadequate toxicological data base for evaluating water quality criteria for zinc due to deficiencies in the experimental studies reported in the literature (EPA, 1980c).

Copper

Copper is widespread in the earth's crust, and the extensive use of copper and its compounds by man since prehistoric times has added copper to the environment and the ecosystem in highly variable concentrations.

Most copper absorption in man takes place in the stomach and the duodenum. It is rapidly transported to the blood serum and taken up by the liver. Approximately 40 to 60 percent of dietary copper is absorbed, the remainder being fecally excreted.

Copper toxicity produces a metallic taste in the mouth, nausea, vomiting, epigastric pain, diarrhea, and depending on the severity, jaundice, hemolysis, hemoglobinuria, hematuria, and oliguria. In severe cases, anuria, hypotension, and coma can occur.

A non-fatal type of copper poisoning has symptems of laryngitis, bronchitis, intestinal colic with catarrh, diarrhea, general emaciation, and anemia.

There is some evidence that copper may increase the mutagenic activity of other compounds, including triose reductone and ascorbic acid.

There is very little evidence in literature to suggest that copper has a teratogenic effect in either animals or humans. Copper itself has not been shown to be mutagenic. There is very little evidence in literature to suggest that copper has a carcinogenic effect in either animals or humans. (EPA, 1980d).

Cadmium

Cadmium is a biologically non-essential, non-beneficial element of high toxicity potential. The major route of cadmium exposure to humans is dietary. Drinking water normally does not contain cadmium in concentrations greater than one ug/L, accounting for less than ten percent of the

total daily absorption for the majority of the U.S. population. Airborne occupational exposure is another recognized route for human exposure to cadmium. It is absorbed into the body through the gastrointestinal tract, concentrating in the liver, kidneys, pancreas, and thyroid glands of humans and animals (Sittig, 1981).

Cadmium has been shown to be teratogenic in several rodent species following the administration of large parental dosages (4-12 mg/kg). Studies investigating the mutagenic potential of cadmium ae inconsistent.

The International Agency for Research on Cancer (IARC, 1982) has classified cadmium as a chemical for which there is sufficient evidence of carcinogenicity in animals, however, inadequate data exists for humans. (EPA, 1980e).

References

- U.S. Environmental Protection Agency, Office of Water Regulations and Standards, 1980a. "Ambient Water Quality Criteria for Arsenic", Washington, D.C.
- U.S Environmental Protection Agency, Office of Water Regulations and Standards, 1980b. "Ambient Water Quality Criteria for Lead", Washington, D.C.
- U.S. Environmental Protection Agency, Office of Water Regulations and Standards, 1980c. "Ambient Water Quality Criteria for Zinc", Washington, D.C.
- U.S. Environmental Protection Agency, Office of Water Regulations and Standards, 1980d. "Ambient Water Quality Criteria for Copper", Washington, D.C.
- U.S. Environmental Protection Agency, Office of Water Regulations and Standards, 1980e. "Ambient Water Quality Criteria for Cadmium", Washington, D.C.
- Sittig, Marshal, ed. 1981. "Handbook of Toxic and Hazardous Chemi-cals". Noyes Publications, Park Ridge, New Jersey.

APPENDIX G

NCP POTENTIALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

APPENDIX G

NCP POTENTIALLY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

- 1. EPA's Office of External Affairs, Section 404 (b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230).
- 2. EPA's Office of Solid Waste administers, inter alia, the Resource Conservation and Recovery Act of 1976, as amended (Publ. L. 94-580, 90 Stat 95, 42 U.S.C. 6901 et seq.). Potentially applicable or relevant requirements pursuant to that Act are:
 - A. Open Dump Criteria Pursuant to RCRA Subtitle D criteria for classification of solid waste disposal facilities (40 CFR Part 257). Note: Only relevant to nonhazardous wastes.
 - b. In most situations, Superfund wastes will be handled in accordance with RCRA Subtitle C requirements governing standards for owners and operators of hazardous waste treatment, storage, and disposal facilities: 40 CFR Part 264, for permitted facilities, and 40 CFR Part 265, for interim status facilities.
 - o Groundwater Protection (40 CFR 264.90-264.109)
 - o Groundwater Monitoring (40 CFR 265.90-265.94)
 - o Closure and Post Closure (40 CFR 264.110-264.120, 265.110-265.112)
 - o Waste Piles (40 CFR 264.250-264.269, 265.250-265.258)
 - o Landfills (40 CFR 264.300-264.339, 265.330-265.316)
- 3. EPA's Office of Air and Radiation administers several potentially applicable or relevant and appropriate statutes and regulations including:
 - a. Clean Air Act (42 U.S.C. 7401).
 - o National Ambient Air Quality Standards for total suspended particulates (40 CFR Parts 50.6-50.7)
- 4. EPA's Office of Water administers several potentially applicable or relevant and appropriate statutes and regulations including:
 - a. Section 14.2 of the Public Health Service Act as amended by the Safe Drinking Water Act as amended (Pub. L.93-523, 88 Stat. 1660, 42 U.S.C. 300f et. seq.).

- o Maximum Contaminant Levels (for all sources of drinking water exposure). (40 CFR 141.11-141.16)
- Clean Water Act as amended (Pub. L. 92-500, 86 Stat. 816, 33 U.S.C. 1251 et. seq.).
 - Requirements established pursuant to sections 301, 302, 303, (including State water quality standards), 306, 307, (including Federal pretreatment requirements for discharge into a publicly owned treatment works), and 403 of the Clean Water Act. (40 CFR Parts 131.400-469).

5. Other Federal Requirements

- a. OSHA requirements for workers engaged in response activities are codified under the Occupational Safety and Health Act of 1970 (29 U.S.C. 651). The relevant regulatory requirements are included under:
 - Occupational Safety and Health Standards (General Industry Standards) (29 CFR Part 1910).
 - o The Safety and Health Standards for Federal Service Contracts (29 CFR Part 1926).
 - o Recordkeeping, reporting, and related regulations (29 CFR Part 1904).
- b. Historic Sites, Buildings, and Antiquities Act (16 U.S.C. 461).
- c. National Historic Preservation Act, 16 U.S.C. 470. Compliance with NEPA required pursuant to 7 CFR Part 650. Protection of Archaeological Resources: Uniform Regulations-Department of Defense (32 CFR Part 229, 229.4). Department of the Interior (43 CFR Part 7, 7.4).
- d. DOT Rules for the Transportation of Hazardous Materials, 49 CFR Parts 107, 171.1-171.500. Regulation of activities in or affecting waters of the United States pursuant to 33 CFR Parts 320-329. The following requirements are also triggered by Fund-financed actions:
 - o Endangered Species Act of 1973, 16 U.S.C. 1531. (Generally, 50 CFR Parts 81, 225, 402). Wild and Scenic Rivers Act, 16 U.S.C. 1271.
 - o Fish and Wildlife Coordination Act, 16 U.S.C. 661 note.
 - o Fish and Wildlife Improvement Act of 1978, and Fish and Wildlife Act of 1956, 16 U.S.C. 742a note.

- o Fish and Wildlife Conservation Act of 1980, 16 U.S.C. 2901. (Generally, 50 CFR Part 83).
- o Coastal Zone Management Act of 1972, 16 U.S.C. 1451. (Generally, 15 CFR Part 930 and 15 CFR 923.45 for Air and Water Pollution Control Requirements).

Other Federal Criteria, Advisories, Guidance, and State Standards to be Considered:

- 1. Federal Criteria, Advisories, and Procedures
 - a. Federal Water Quality Criteria (1976, 1980, 1984). Note: Federal Water Quality Criteria are not legally enforceable. State water quality standards are legally enforceable, and are developed using appropriate aspects of Federal Water Quality Criteria. In any cases, State Water Quality Standards do not include specific numerical limitations on a large number of priority pollutants. When neither State standards nor MCLs exist for a given pollutant, Federal Water Quality Criteria are pertinent and, therefore, are to be considered.
 - b. Health Effects Assessments (HEAs).
 - c. Recommended Maximum Concentration Limits (RMCLs).
 - d. OSHA health and safety standards that may be used to protect public health (nonworkplace).
 - e. Health Advisories, EPA Office of Water.
 - f. Public health basis for the decision to list pollutants as hazardous under section 112 of the Clean Air Act.
 - g. EPA's Groundwater Protection Strategy.
 - h. New Source Performance Standards for Storage Vessels for Petroleum Liquids.
 - Advisories issued by FWS and NWFS under the Fish and Wildlife Coordination Act.
 - j. Executive Orders related to Floodplains (11988) and Wetlands (11990) as implemented by EPA's August 6, 1985, Policy on Floodplains and Wetlands Assessments for CERCLA Actions.
 - k. Waste load allocation procedures, EPA Office of Waste.
 - 1. Federal sole source aquifer requirements.

2. State Standards

- a. State Implementation Plans and Delegated Programs Under Clean Air Act.
- b. State of Washington, Final Cleanup Policy.
- c. Requirements of authorized (Subtitle C of RCRA) State Hazardous Waste Programs.
- d. All other State requirements, not delegated through EPA authority.
- e. Approved State NPDES programs under the Clean Water Act.
- f. Approved State UIC programs under the Safe Drinking Water Act. Note: Many other state and local requirements could be pertinent. Forthcoming guidance will include a more comprehensive list.

3. USEPA RCRA Guidance Documents

- a. Test Methods for Evaluating Solid Waste:
 - o Solid Waste Leaching Procedure Manual.
 - o Methods for the Prediction of Leachate Plume Migration and Mixing.
 - o Hydrologic Evaluation of Landfill Performance (HELP) Model Hydrologic Simulation on Solid Waste Disposal Sites.
 - o Procedures for Modeling Flow Through Clay Liners to Determine Required Liner Thickness.
 - o Test Methods for Evaluating Solid Wastes.
 - o A Method for Determining the Compatibility of Hazardous Wastes.
 - Guidance Manual on Hazardous Waste Compatibility.

b. EPA's RCRA Design Guidelines:

- o Surface Impoundments, Liner Systems, Final Cover and Freeboard Control.
- o Waste Pile Design Liner Systems.
- o Land Treatment Units.
- o Landfill Design Liner Systems and Final Cover.

c. Technical Resource Documents (TRDs):

- Evaluating Cover Systems for Solid and Hazardous Waste.
- o Hydrologic Simulation of Solid Waste Disposal Sites.
- o Landfill and Surface Impoundment Performance Evaluation.
- o Management of Hazardous Waste Leachate.
- o Guide to the Disposal of Chemically Stabilized and Solidified Waste.
- o Closure of Hazardous Waste Surface Impoundments.
- o Hazardous Waste Land Treatment.
- o Soil Properties, Classification, and Hydraulic Conductivity Testing.

d. Permitting Guidance Manuals:

- o Permit Applicant's Guidance Manual for Hazardous Waste Land Treatment, Storage, and Disposal Facilities.
- o Permit Writer's Guidance Manual for Hazardous Waste Land Treatment, Storage, and Disposal Facilities.
- o Permit Writer's Guidance Manual for Subpart F.
- o Permit Applicant's Guidance Manual for the General Facility Standards.
- o Waste Analysis Plan Guidance Manual.
- o A Guide for Preparing RCRA Permit Applications for Existing Storage Facilities.
- o Guidance Manual on Closure and Postclosure Interim Status Standards.

4. USEPA Office of Water Guidance Documents

- a. Water Quality Guidance Documents:
 - o Technical Support Manual: Waterbody Surveys and Assessments for Conducting Use Attainability Analyses (1983).
 - o Water-Related Environmental Fate of 129 Priority Pollutants (1979).
 - Water Quality Standards Handbook (1983).

- o Technical Support Document for Water Quality-Based Toxics Control.
- b. NPDES Guidance Documents:
 - o NPDES Best Management Practices Guidance Manual (June 1981).
 - Case studies on Toxicity Reduction Evaluation (May 1983).
- c. Pretreatment Guidance Documents:
 - o 304(g) Guidance Document Revised Pretreatment Guidelines (3 Volumes)
- 5. USEPA Manuals for the Office of Research and Development
 - SW 846 methods-laboratory analytic methods.
 - b. Lab protocols developed pursuant to Clean Water Act Section 304(h).

APPENDIX H

TECHNOLOGY COST CALCULATIONS

APPENDIX H
TECHNOLOGY COST CALCULATIONS

Technological Activity	Cost Date	Source	Base Cost Estimate	Cost Modifiers Cost		Comments	
Grading	1982	ELI	\$4720/acre	1.4 Health & Safety Factor 1.2 Cost Index Ratio	\$7552/acre	Does not include fill material cost	
Soil Excavation	1985	EPA	\$2.00/yd ³	3.0 Health & Safety Factor	\$6.00/yd ³		
Backfill Material	1986	Verbal Quote	\$3.00/yd ³	-	\$3.00/yd3	Soil costs	
Topsoil	1985	EPA	\$10.30/yd ³	-	\$10.30/yd ³	include delivery	
Revegetation Capital O&M Capping	1982 1982	ELI ELI	\$1500/acre \$800/acre/yr	1.2 Cost Index Ratio 1.2 Cost Index Ratio	\$1800/acre \$960/acre/yr	Includes hydro- seeding & mulching	
Asphalt Capital O&M Concrete Capital O&M	1986 1982 1986 1982	Verbal Quote ELI Verbal Quote ELI	\$40,900 lump sum \$700/yr \$11.25/yd ² \$700/yr	- 1.2 Cost Index Ratio - 1.2 Cost Index Ratio	\$40,900 lump sum \$840/yr \$11.25/yd ² \$840/yr	4"Base, 4" Asphalt 4" with sealed seams	
RCRA Cap Capital O&M	1985 1982	EPA ELI	\$49/yd ² \$700/yr + \$800/acre/yr	- 1.2 Cost Index Ratio	\$49/yd ² \$840/yr + \$960/acre/yr	Includes 3" top soil,1' sand, 'l compacted clay, 30-mil HPDE liner, 2' compacted clay, filter fabric & quality testing	

APPENDIX H
TECHNOLOGY COST CALCULATIONS, CONT.

Technological Activity	Cost Date	Source	Base Cost Estimate	Cost Modifiers	Present Cost	Comments
Bentonite Admix. Capital	1985	EPA	\$10/yd ²	- ·	\$10/yd ²	Includes mixing & placing
Synth. Membranes Non-reinforced Reinforced	1985 1985	EPA EPA	\$11/yd ² \$13/yd ²	<u>-</u> -	\$11/yd ² \$13/yd ²	Inc. installation but not earthwork
Transport Soils	1986	Verbal Quote	\$38/ton	-	\$68.4/yd ³	1.8 tons/yd ³
Disposal Soils/Dust/Bldg Soils/Dust/Bldg	1986 1986	Verbal Quote Verbal Quote	\$114/ton \$14/ton	- -	\$205.2/yd ³ \$25.2/yd ³	At Arlington At sanitary land- fill
Ind. Vacuuming	1986	Verbal Quote	\$30,000 lump sum	-	\$30,000 lump sum	Does not include disposal
Bldg. Demolition	1986	Average Bid	\$17,300 lump sum	-	\$17,300 lump sum	Complete demoli-
Chemical Dust Suppressant	1985	EPA	\$800/acre	-	\$800/acre	
Solidification Cement-based Lime-based	1985 1985	EPA EPA	\$75/ton \$40/ton	- -	\$135/yd ³ \$72/yd ³	Does not include secondary containment or final transport & disposal

APPENDIX H
TECHNOLOGY COST CALCULATIONS, CONT.

Technological Activity	Cost Date	Source	Base Cost Estimate	Cost Modifiers	Present Cost	Comments
Thermoplastic	1985	EPA	\$45/ton	-	\$81/yd ³	Includes secondary containment but not final trans-
Surface Micro- encapsulation	1985	EPA	\$90/ton	-	\$162/yd ³	port & disposal Does not include final transport &
Glassification	1982	EPA	\$85/ft ³	1.2 Cost Index Ratio	\$2754/yd ³	disposal
Recycling at Asarco	1986	Verbal Quote	\$200/ton	_	\$360/yd ³	Does not include transport
Underground Tank Removal	1986	Bid	\$2800 lump sum	_	\$2800 lump sum	

Sources:

EPA - U.S. Environmental Protection Agency, 1985. Remedial Action at Waste Disposal Sites.

ELI - Environmental Law Institute, 1985. Compendium of Costs of Remedial Technologies at Hazardous Waste Sites.

APPENDIX I

SOUTH TACOMA INDUSTRIAL WASTE SURVEY - 1982

SOUTH TACOMA INDUSTRIAL WASTE SURVEY

1982



by: Doug Pierce Steve Rogers



ENVIRONMENTAL HEALTH

DOUG PIERCE, R.S. Solid Waste Program Manager 591-6571

TACOMA-PIERCE COUNTY HEALTH DEPARTMENT

3629 SOUTH DIST TACCMA, WASHINGTON 98408

oth Tacoma as an automobile production center. Leonard began his operation in the old South Tacoma Garage at S. 54th and Washington. This facility was primarily a dealership for White Steamers which became an auto rental agency in 1907 when fire swept through the dealership, burning one of the cars. Leonard later moved to a new building in the 5600 block of South Tacoma Way. This new location served as both a garage and automobile assembly plant. Parts for Currier, Metz and Stoddard-Dayton cars were shipped in by boxcar and assembled in the South Tacoma plant. In 1916 Leonard obtained a Ford agency which Tom Mallon bought from the Leonard family during the Great Depression.

In 1928 the dominant feature of the South Tacoma area was still the Northern Pacific Railroad shops. These shops were the largest Northern Pacific facility west of Minneapolis. With approximately 135 acres of land and 48 acres of roofing, it was the largest employer in South Tacoma. The exployment of the NPRR yards extended to related industries which settled in the immediate area as suppliers of the NP.

Griffen Wheel bought their plant from the American Foundry Company in 1897. As a major supplier of wheels, brass and lead castings to the NP, Griffen Wheel grew with the rail yard. Slag and tailings from the foundry pre-re deposited on the west side of the foundry.

At 5402 South Washington there was a firm called Specialty Foundry. While very little is known about this business, one might assume they had slag and tailing piles as well as some other industrial wastes.

While the Northern Pacific had Griffen Wheel (and perhaps Specialty Foundry) doing some facets of their metal work, the NP shops had their own blacksmith

nd casting facilities. This reportedly included a zinc plant which did zinc casting and galvinizing work.

The NPRR shops of 1928 were the major facilities for building and repairing passenger coaches and freight cars. These were also the primary shops for the steam locomotives. Locomotives were repaired and cleaned at this location. A former employee recalled two cleaning tanks, one presumably hot caustic and the other a cold solvent tank. These tanks were roughly 20' x 50' x 12'. They were dug into the ground and lined with cement. While the exact contents of these tanks was not known by any of the former employees contacted during this study, the contents have been inferred from the characteristics of these dip vats. It is not known how often, if ever, these vats were cleaned and/or changed.

An inventory of businesses from the Tacoma city directory of 1928 listed roughly 100 commercial entities in the South Tacoma Channel area. Roughly 50% of those entities were engaged in the automobile and/or petroleum products distribution. Even in 1928, South Tacoma had a district "auto row" located between South 56th and South 60th on Union Ave. (now called South Tacoma Way). This section of South Tacoma Way had retained this identity to the present. Service stations, which are presumed to have been primarily fuel distributors, were scattered throughout the South Tacoma Channel area.

It has only been during the past few years that our socity has realized the potentially harmful effects of the various oils and solvents used in the automotive maintenance business. In 1928 there were 22 businesses involved in automobile sales and service between South 56th and South 70th on Union Ave. Such a concentration of business indicated this segment of South Tacoma Way could be a potential "hot spot" of solvent contamination.

In the northern end of the South Tacoma Channel there were two large oil producer/distributors. These were the Texas Co. oil producers of 3007 S. Pine,

and mineral spirits" stain. The staining machine is cleaned by letting the stain run onto the ground. This runoff could be an historic pollution problem. Another finishing company has extremely concentrated solvent vapors but no apparent on-site pollution. The primary concern at this shop is the small amount of sludge which goes into the dumpster.

<u>Miscellaneous</u>

Of the 13 firms which did not fit into any of the previous categories, only one had practices of concern. A janitorial service receives free samples of various spot removers, detergents and floor strippers. If these samples don't perform adequately, they are thrown into the dumpster. Some of the carpet spot removers contain carbon tetrachloride, perchlorethylene, trichlorethylene and petroleum naphtha.

Conclusions

The primary objective of this study was to determine what, if any, identifiable practices, either past or present, could be found to explain the contamination of the Tacoma aquifer. The two path approach was used in an effort to help explain the presence of that contamination.

The historical study emphasized the types of industries in the area. It was anticipated that such a study might indicate specific areas which might be historical sources of contamination. While the presence of a potential contributor is not an indication of guilt, it is reasonable to monitor these areas for signs of elevated chemical contamination.

As previously stated, the Tacoma industrial survey was undertaken with the intent of assessing how present day practices might be impacting the Tacoma aquifer. One severe limitation of the survey was the dependence on the open and honest reporting of present practices by the commercial entities. Because . this study was information gathering rather than enforcement oriented, the response of the South Tacoma industrial community was highly cooperative.

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At the time the survey was begun, several businesses were under scrutiny by the Environmental Protection Agency and the Washington State Department of Ecology. It was determined that contacting these firms would be redundant and, most likely, fruitless. These firms were, therefore, exempt from the TPCHD study.

The study of present practices served a dual prupose. First, this survey was educational for many of the firms which did not realize how easily they could adversely impact the aquifer through carelessness or poor housekeeping. Secondly, the survey allowed the Health Department to gauge the quantity of wastes regularly mishandled in the South Tacoma industrial area.

There were approximately 150 firms surveyed which appeared to be potential contributors to groundwater contamination. It must be emphasized that a "potential contributor" might have less solvent in stock than many private homes, yet the possibility exists. The survey indicated that almost 10% of the "potential contributors" showed evidence of solvent or caustic contamination. However, most of these were of quantities less than 5 gallons per month. Indeed, the major problem observed during the survey was oil spillage at the many automotive repair facilities. Several firms had oil soaked areas which resembled asphalt. While oil is not as significant a problem as industrial chemicals or solvents, it could well contribute to the continued degradation of the aquifer.

It must be emphasized that the quantities of oil and solvent being spilled on the ground do not appear to be of sufficient quantities to explain the levels found in well 12-A. These practices would more likely manifest themselves as a slow deterioration of the whole aquifer, not a high level in one well. The high levels found in well 12-A would seem to indicate isolated events, involving rather sizable quantities of the various contaminants found in the water samples. While it is possible that this contamination is from an

cannot be ruled out but neither would it be a safe statement.

One of the other widespread practices which is of concern to the TPCHD involves the use of garbage dumpsters. The dumpster is among the few remaining bastions of the "out of sight, out of mind" attitudes so prevalent in the past. Many firms that are conscious about contaminating the soils or floors of their buildings will throw gallons of spoiled paint, solvents, or dip-type carburator cleaners into their dumpsters. While such a practice does reduce the rate of groundwater contamination in the channel area, it might well accelerate the degradation of the groundwater in the area of the landfill.

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ENVIRONMENTAL LABORATORY DATA SUMMARY METALS

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ACE GRIFFEN	WHEEL PIGING COUNTY	AM NUMBER	572-1-573

DATE COLLECTED 8-5-82 RECEIVED 8-5-82 COLLECTED BY WILL ABERCROMBIE

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Sample (Log) Number	Units	Standard Deviation ± %		2000	Foundry		355	0,15%	ray s	
Station:				82-8	Wast6		1154	lank		
Cu	mg/Ky	10		14×10 ³						
Zn	ma/ Kg	10		185 K						
Βα	mg/Kg	10		10.						
	ms/									
f a	m3/kg	10		40,						
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H5	1/49	±10%		4.		<u> </u>				
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NOTE:	Dissolved Metals:	Those that will pass through a 0.45 μ membrane filter
		TE SANTA DE LOS APLAS DE LA PRIMA

Suspended Metals: Those retained by a 0.45 μ membrane filter. Total Metals: Those found in the unfiltered, rigorously acid digested sample

mg/L= ppb = ng/ml

//g/L= ppb = ng/ml

mg/kg = ppm - µg/gm µg/kg = ppb = ng/gm

" < " is "less than" and " > " is "greater then"

EC7 040-2-82 (*) Rev. 8/81

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REDMOND ENVIRONMENTAL LABORATORY

DATA SUMMARY

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NOTE: Dissolved Metals: Those that will pass through a 0.45 μ membrane filter Suspended Metals: Those retained by a 0.45 μ membrane filter Total Metals: Those found in the unfiltered, rigorously acid digested sample

mg/L= ppm = /ug/ml /ug/L= ppb = ng/ml

mg/kg = ppm - /Lg/gm /Lg/kg = ppb = ng/gm

" <" is "less than" and " >" is "greater than

SUMMARIZED BY DATE 9/20/82

REVIEWED BY DATE 7/30/82 SUMMARIZED BY

ECY 040-2-32(a) Rev. 11/80

APPENDIX J

PRELIMINARY SITE INVESTIGATION SOUTH TACOMA SWAMP - 1983

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY CINCINNATI, OHIO

PRELIMINARY SITE INVESTIGATION

South Tacoma Swamp Tacoma, Washington

CONTRACT NUMBER 68-03-1614 WORK ASSIGNMENT Z-3-6

B&V Project No. 9860.C03

June 1983

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City of Tacoma, Water Division
City of Tacoma, Sewer Utility Division
City of Tacoma, Department of Public Works
Tacoma-Pierce County Health Department (TPCHD)
State of Washington, Department of Social and Health Services
(DSHS)
State of Washington, Department of Ecology (DOE)

Their cooperation during this investigation was appreciated.

AUTHORIZATION

The Preliminary Site Investigation, South Tacoma Swamp was authorized under Work Assignment Z-3-6, EPA Contract 68-03-1614. The work assignment was authorized July 29, 1982.

Property access for performance of field activities was obtained by the U.S. Environmental Protection Agency, Region 10.

INTRODUCTION

This investigation was conducted under the direction of Black & Veatch, Engineers-Architects. Woodward-Clyde Consultants provided geotechnical consultation and field support under a subcontract to Black & Veatch. Laboratory analytical support was provided by the EPA Contract Laboratory Program.

The scope of the preliminary site investigation was to locate and identify contaminants in the ground water, surface water, surface soil, and subsurface soil. The objectives of the investigation were to define the potentiometric surface for the study area to perform a magnetometer survey in areas designated by the EPA Region 10 and to obtain representative samples of the ground water, surface water, surface soil, and subsurface soil. Evaluation and interpretation of data presented herein is to be accomplished by others as directed by the EPA.

FIELD INVESTIGATION

An initial site survey was conducted during the first week of August 1982. The purpose of this visit was to familiarize project personnel with the area, survey the topography and surficial geology and to review historical information so that well and sample locations could be selected. A meeting was held with representatives of the TPCHD and EPA Region 10 on August 4, 1982 to review the historical information obtained under the direction of Mr. Doug Pierce of the TPCHD. The preliminary well and sample locations were discussed during this meeting. Preliminary well and sample locations were selected near previous railroad facilities, suspected drum burial areas, PCB tank draining areas, and along drainage ways which were identified during the historical survey and the site visits. A literature review of available data describing the regional geology and hydrology was conducted in conjunction with the Well 12A Remedial Investigation. The descriptions of the regional geology and hydrogeology are presented herein.

The field activities were initiated during the first week of August, 1982 and were completed during the first week of December, 1982. The field investigation program included initial site reconnaissance, installation of thirteen ground-water monitoring wells, and sampling of surface water, ground water, surface soil, and subsurface soil. Well and sampling locations, shown in Figure 1 and listed in Table 1, were selected to provide coverage of potential source areas identified during a historical survey by the Tacoma-Pierce County Health Department (TPCHD) and to provide data on the geology and hydrogeology of the area. Air quality was monitored during all phases of the field investigation using a Century Model 128 Organic Vapor Analyzer (OVA) in the survey mode. A magnetometer survey was conducted in the fill area north and east of monitoring well CBS-08 and in the areas approximately 120 feet by 120 feet surrounding monitoring wells CBS-01, 02, 03, 06, and 09 using a Geometrics Model G-586 Proton Precision Magnetometer.

Surface-Water Sampling

Surface-water samples were obtained at the locations summarized in Table 1. The surface-water samples were obtained by submersing a half-gallon glass jar in the water and then filling the sample containers. The first bottle of water was used to fill the two 40-ml volatile organics vials. The remaining water from the first jar was poured into a plastic container and used to obtain field measurements of the pH, salinity, conductivity, and temperature. The pH was measured using a Horizon Model 59 pH meter. The pH meter was calibrated using a pH 7 buffer solution prior to and subsequent to each sample measurement. The

WELL AND SAMPLE LOCATIONS SOUTH TACOMA SWAMP

Well Number	Locations
CBS-01	Located on Burlington-Northern property approximately 1,250 feet south of center of Adams and 35th Street, in a surface depression.
CBS-02	Located on Burlington-Northern property on a line extended from S. 40th Street approximately 280 feet south and 640 feet west of City Well 4A.
CBS-03	Located on Burlington-Northern property approximately 370 feet south of lines extended from S. 45th Street and Procter Street.
/CBS-04	Located on Anderson Enterprises property north and east of the entrance of the Medeira Corporation on Procter Street.
CBS-05	Located on city property on the west side of Procter Street approximately 760 feet north of the center of S. 56th Street.
CBS-06	Located on Burlington-Northern property approximately 790 feet south of the center of S. 48th Street and approximately 440 feet east of S. Manitou Way.
CBS-07	Located on city property on the west side of Adams Street approximately 200 feet north of the center of 47th Street at 4520 Adams.
CBS-08	Located on Burlington-Northern property approximately 400 feet east of lines extended from the intersection of Tyler Street and S. Manitou Way.
CBS-09	Located on Pacific Container Corporation property approximately 470 feet north of the intersection of lines extended from S. 56th Street and S. Manitou Way.
CBS-10	Located on city property between the sidewalk and curb on the west side of Washington Street approximately 270 feet north of the center of S. 56th Street.

WELL AND SAMPLE LOCATIONS SOUTH TACOMA SWAMP

Well Number	Locations
CBS-11	Located on city property in the southwest corner of S. 51st and Adams Streets or 207 feet west of the east curb line of Washington and 340 feet south of south curb at S. 50th Street.
CBS-12	Located on city property on the east side of Madison Street on a line extending from the centerline of S. 49th Street.
CBS-13	Located on Burlington-Northern property 17.3 feet north of CBS-06 and approximately 807 feet south of the center stall of a line extending from the center of S. 48th Street.
Surface Water	
CBS-14	Located on Burlington-Northern property approximately 80 feet north and 80 feet west of the intersection of lines extended from the centerline of S. 42nd and Monroe Streets.
CBS-15	Located on Burlington-Northern property approximately 650 feet south and 350 feet east of the intersection of lines extended from the centerlines of S. 42nd Street and S. Manitou Way.
CBS-16	Located on Burlington-Northern property approximately 920 feet south of the center of a line extended from the center of S. 42nd Street and approximately 360 feet east of the center of S. Manitou Way.
CBS-17	Located on Burlington-Northern property just west of a power pole approximately 590 feet north of the center of a line extended from the center of S. 48th Street and 400 feet east of S. Manitou Way.
CBS-18	Located on Burlington-Northern property approximately 90 feet north of the centerline of S. 48th Street and approximately 290 feet east of S. Manitou Way.
CBS-19	Located on Lige Dickson property in a drainage ditch approximately 210 feet south of a line extended from the centerline of S. 48th Street and 520 feet west of Madison Street.

WELL AND SAMPLE LOCATIONS SOUTH TACOMA SWAMP

Surface Water	Locations
CBS-20	Located on Lige Dickson property at the north end of a pond just east of S. 49th Street and S. Manitou Way.
CBS-21	Located on city property at the southeast corner of the same pond as CBS-20.
CBS-22	Located on city property at the south end (upstream) of a culvert under the S. 50th Street right of way approximately 660 feet east of the center of S. Manitou Way.
CBS-23	Located on Burlington-Northern property at a small pond approximately 50 feet north of a projection from the center of S. 52nd Street and approximately 250 feet east of the center of S. Manitou Way.
CBS-24 through CBS-25	Not Used.
Soil Samples	
CBS-26	Located in the City of Tacoma's public utilities storage yard, approximately 870 feet south and 880 feet west of the intersection of S. 35th Street and Union Street.
CBS-27	Located at same location as CBS-26 but at a depth of approximately 1 foot.
CBS-28	Located on Burlington-Northern property west of the D&B Fuel Property at the intersection of Washington Street and S. Tacoma Way. The sample was taken between the west fence line and the railroad tracks.
CBS-29	Located on Burlington-Northern property at the same location as CBS-28 but at a depth of approximately 1 foot.
CBS-30	Located on Burlington-Northern property on the east side of the drainage ditch approximately 60 feet south and 50 feet west of the intersection of lines extending from S. 42nd and Monroe Streets.
CBS-31	Located on Burlington-Northern property at the same location as CBS-30 but at a depth of approximately 1 foot.

WELL AND SAMPLE LOCATIONS SOUTH TACOMA SWAMP

Soil Samples	Locations
CBS-32	Located on Burlington-Northern property in an excavation approximately 200 feet north and 210 feet east of the intersection of S. 52nd Street and S. Manitou Way.
CBS-33	Located at the same location as CBS-32 but at a depth of approximately 1 foot.
CBS-34	Located on Anderson Enterprises property approximately 300 feet south of the Old Griffin Wheel Foundry and approximately 130 feet west of a line extended from the centerline of Proctor Street.
#CBS-35	Located on Anderson Enterprises property at the same location as CBS-34 but at a depth of approximately 1 foot.
CBS-36	Located on Burlington-Northern property in the landfill/dump area. The sample location is approximately 110 feet south of the S. 50th Street right of way and approximately 260 feet west of the centerline of Madison Street.
CBS-37	Located at the same location as CBS-36 but at a depth of approximately 1 foot.
CBS-38	Located on Burlington-Northern property approximately 150 feet south and 770 feet east of the intersection of S. Manitou Way and S. 52nd Street.
CBS-39	Located at the same location as CBS-38 but at a depth of approximately 1 foot.
CBS-40	Located on Anderson Enterprises property approximately 840 feet north and approximately 40 feet east of the intersection of S. 56th and Proctor Streets.
€ 8S-41	Located on Anderson Enterprises property at the same location as CBS-40 but at a depth of approximately 1 foot.
CBS-42 through CBS-46	Not Used.

WELL AND SAMPLE LOCATIONS SOUTH TACOMA SWAMP

Soil Samples	Locations						
CBS-47	Located on Burlington-Northern property approximately 620 feet south and 140 feet west of the intersection of a line extended from the center of S. 48th Street and Madison Street.						
CBS-48	Located at the same location as CBS-47 but at a depth of approximately I foot.						
CBS-49	Abandoned railroad well located on General Plastics property approximately 91 feet from the northwest corner and 147 feet from the northeast corner of the General Plastics Corporation building.						

salinity, conductivity, and temperature were measured using a Yellow Springs Instrument Model 33 SCT meter. The SCT meter was calibrated using a buffer solution prior to each sampling effort. Subsequent bottles of surface water were used to fill bottles for the analysis of extractable priority pollutant organics, ammonia, metals, cyanide, sulfide, chloride, and nitrate. A summary of the field analyses for the surface-water samples is presented in Table 2. After the samples were packaged, they were shipped to the EPA contract laboratories for analysis. Table A-1 of Appendix A lists the EPA contract laboratories which were utilized and analytical detection limits. The results of the surface-water analyses for detected priority pollutant organics, metals, and other inorganics are summarized in Table A-2 of Appendix A.

Monitoring Well Installation and Development

Twelve shallow wells and one deep well were installed at the locations given in Figure 1 and summarized in Table 1. The borings for the twelve shallow wells were advanced using a 4-inch inside diameter, 10-inch outside diameter hollow-stem auger with an 11-inch drill bit. Soil samples were obtained at 5-foot intervals with a Dames & Moore sampler, extruded in the field, logged by a geologist and placed in glass sample containers. The borings were advanced to a depth which was approximately 7 feet below the depth at which the water table was first encountered. After the boring for each monitoring well was advanced to the final depth, a 2-inch PVC casing with 5 feet of slotted (0.010 inch) well screen was placed in the hollow stem. Coarse sand was then placed in the annulus around the well screen to a height approximately 2 feet

TABLE 2 SURFACE-WATER SAMPLE - FIELD MEASUREMENTS
SOUTH TACOMA SWAMP

Sample Location	Color	Turbidity	рН	Salinity*	Conduct- ivity **	Temperature (°C)	Date
CBS-14	clear	clear	6.1	0.1	140.	13.5	10-22-82
CBS-15	tt	11	6.2	0.1	80.	14.0	10-22-82
CBS-16	11	11	6.3	0.1	150.	14.0	10-22-82
CBS-17	11	11	6.2	0.1	145.	14.0	10-22-82
CBS-18	slightly yellow	clear	6.7	0.4	217.	12.0	10-25-82
CBS-19	slightly yellow	clear	6.5	0.4	225.	12.0	10-25-82
CBS-20	slightly brown	clear	6.8	0.3	190.	12.8	10-25-82
CBS-21	clear	11	6.2	0.5	800.	16.0	10-25-82
CBS-22	11	11	8.2	1.0	900.	14.0	10-25-82
CBS-23	n	11	6.8	0.9	800.	15.0	10-25-82

^{*} parts per thousand
** micromhos per centimeter

above the top of the well screen as the auger was withdrawn. A 2- to 4-foot-thick bentonite slurry seal was then placed by the tremmie method above the filter pack. The remaining annulus from the top of the bentonite seal to the ground surface was filled with a cement/bentonite grout and a 4-inch diameter protective steel casing with locking cap was installed.

The deep well, CBS-13, was installed using an air-rotary drilling rig. Soil samples were obtained at 10-foot intervals using a Dames & Moore sampler, extruded, logged by a geologist, and placed in glass sample containers. A 6-inch-diameter steel casing was driven behind the drill bit in 10-foot intervals to the desired depth. A 4-inch-diameter PVC casing with 20 feet of slotted (0.010 inch) well screen was placed in the hole and a filter pack of coarse sand was placed in the annulus around the well screen as the steel casing was removed. The filter pack was placed to a height at least 2 feet above the top of the well screen. A bentonite slurry seal, 10 feet thick, was then placed above the filter pack. The remaining annulus from the top of the bentonite seal to the ground surface was filled with a cement/bentonite grout. The steel casing was withdrawn to approximately 10 feet above the top of the water table and cut off approximately 6 inches above the top of the PVC well riser. A locking cap was installed on the well. The boring logs for the well borings are presented in Appendix B. The well installation reports are presented in Appendix C.

The twelve shallow wells were developed using bailers which were dedicated to each well. The water column was agitated by moving the

bailer up and down in the hole. Approximately five well volumes of water were then removed from each well using the bailer to remove suspended particulate matter. The deep well was developed using a submersible pump. The turbulent flow created by the pump was sufficient to put the fines in suspension for removal. Approximately five well volumes of water were removed during development of the deep well. The depths of the borings for the thirteen monitoring wells are summarized in Table 3. Water surface elevations were measured prior to obtaining each groundwater sample. Additional water surface elevation data was collected on October 14, 1982 and November 24, 1982. The potentiometric head map developed from the water surface elevations measured on October 14, 1982 and November 24, 1982 are presented in Figures 1, 2 and 3, respectively.

It is likely that precipitation, the pumping of the utility wells at the City of Tacoma Department of Public Utilities building, and the cessation of pumping at City Well 9A influenced the potentiometric surface at the north end of the study area. Recovery of the aquifer is apparent between the potentiometric head contours of October 14 and November 24, 1982 where the water levels increased by about 1 foot over the entire study area.

Water level measurements were also obtained at the monitoring wells near City Well 12A on November 24, 1982. The potentiometric surface on November 24, 1982, in the vicinity of well 12A is very flat and slightly higher than the potentiometric surface in the South Tacoma Swamp as shown in Figure 8 of the Well 12A Remedial Investigation Report and Figure 3 of this report. Due to the flat potentiometric surface in the vicinity

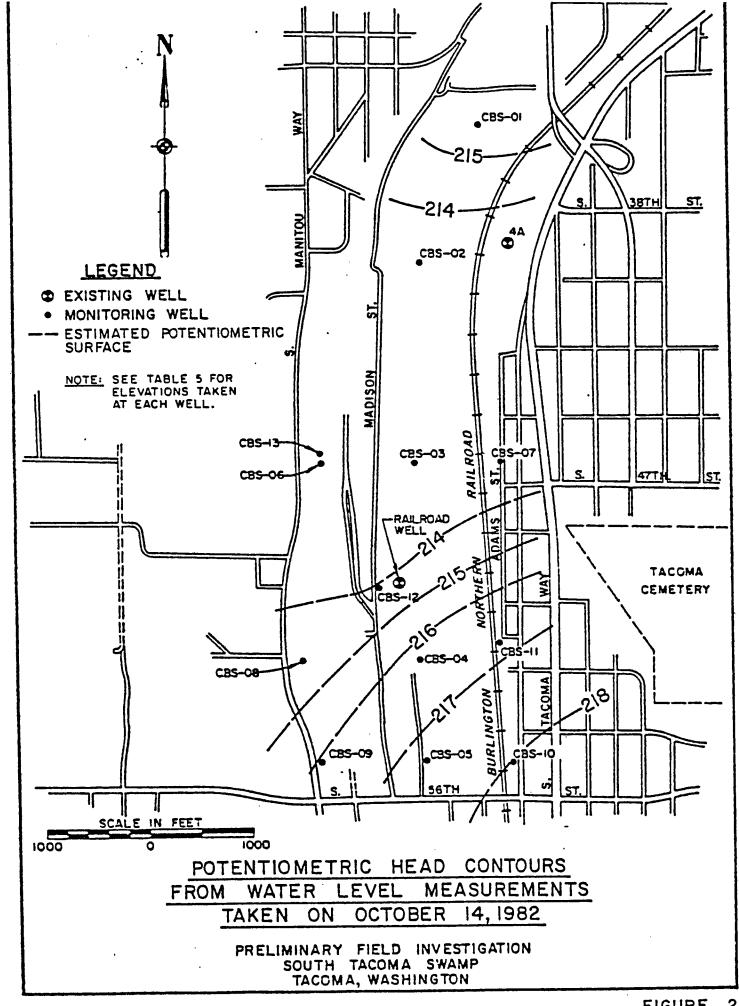
PIEZOMETER INSTALLATION REPORT

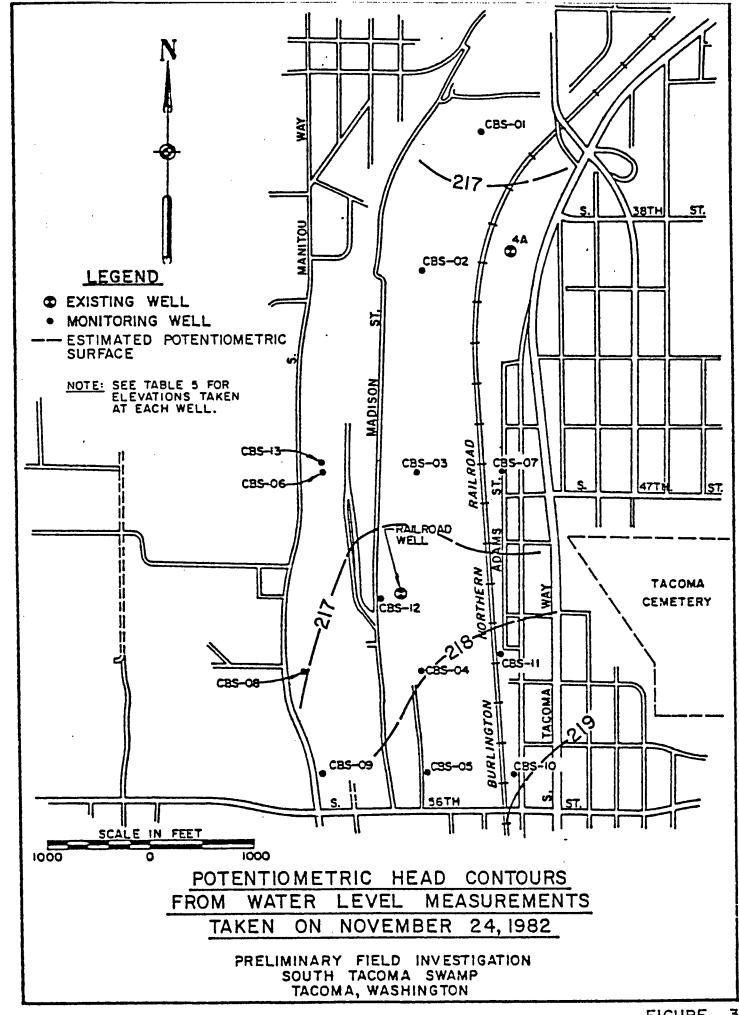
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for detail	Log CBS-13 ed description	1.65	LD. of Riser Pipe 4: Type of Pipe PVC Sched. 40 Type of Backfill Aroun Riser Cement-Bento Grout Top of Seal Elev. 169. Type of Seal Material Bentonite Slurry La. 78.1' La. 78.1' La. 20.0' Ly. 99.0' Top of Filter Elev. 155 Type of Openings 0.0' Natural cave in Size of Openings 0.0' Diameter of Piezamete Tip 4 in. 1.0. Bottom of Piez Elev. 1 Bottom of Boring Elev. 1 Diameter of Boring 6

TABLE 3

SUMMARY OF POTENTIOMETRIC HEAD DATA
SOUTH TACOMA SWAMP

Well	Screened Interval	Boring Depth	Elevation At Top of Steel Riser	Water Surface Elevation(USGS, ft.)	
No.	(Depth, ft)	<u>(ft)</u>	(USGS, ft)	10/14/82	11/24/82
CBS-01	20-30	30.0	240.81	215.6	217.1
CBS-02	28-33	33.0	241.78	213.1	216.8
CBS-03	39-44	44.0	251.14	213.6	216.8
CBS-04	38-43	43.5.	252.30	216.3	218.0
CBS-05	23-28	29.0	239.28	217.4	218.5
CBS-06	23-28	28.0	234.37	213.3	216.6
CBS-07	43-48	48.0	255.40	213.1	216.1
CBS-08	13-18	18.0	226.44	214.3	217.0
CBS-09	29-34	34.0	243.88	216.1	215.9
CBS-10	39-44	44.0	256.45	218.0	218.9
CBS-11	39-44	44.2	254.68	216.8	218.1
CBS-12	28-33	33.0	240.79	214.0	217.3
CBS-13	76-96	99.0	234.90	-	216.5





of City Well 12A and the unknown influence of the utility wells and City Well 9A between the two areas, the data from the two investigations were not combined into a single potentiometric surface map.

Ground-Water Sampling

The wells were flushed prior to being sampled. Approximately three to five well volumes of water were bailed. Ground-water samples were obtained approximately 24 hours after flushing using the dedicated bailer. All of the wells were sampled in the screened interval. Samples were obtained using boilers and prepared for analyses using the same procedures as for the surface-water samples.

Two sets of ground-water samples were obtained from the thirteen monitoring wells. The first set of ground-water samples was obtained beginning on October 18. The second set of ground-water samples was obtained approximately two weeks subsequent to the first set.

Two private wells, the Railroad Well and the Soccer Well were identified during an historical survey by the Tacoma-Pierce County Health Department and included in the South Tacoma Swamp Site Sampling Plan. The Railroad Well is a large diameter abandoned production well. One ground-water sample was obtained from the Railroad Well. The field crew attempted to sample the referenced Soccer Well but found that it was only a sump, thus, no sample was taken.

The summary of the parameters measured for ground-water samples during the field analysis is presented in Table 4. The detected priority pollutant organics, metals and other inorganics are summarized in Table A-3 of Appendix A.

TABLE 4 GROUND-WATER SAMPLE - FIELD MEASUREMENTS SOUTH TACOMA SWAMP

Sample Location	Color	Turbidity	рН	Salinity*	Conduct- ivity **	Temperature (°C)	Date
CBS-01	clear	very turbid	6.3	0.2	190.	11.0	10-20-82
CBS-01	brown	very turbid	6.2	0.3	195.	11.0	11-10-82
CBS-02	clear	slightly	6.3	0.2	195.	10.0	10-20-82
CBS-02	clear	slightly	6.3	0.3	168.	10.0	11-10-82
CBS-03	clear	slightly	6.6	0.2	150.	10.2	10-20-82
CBS-03	clear	clear	6.3	0.3	167.	10.0	11-10-82
CBS-04	brown	turbid	7.7	0.5	310.	11.0	10-20-82
CBS-04	clear	slightly	6.8	0.5	272.	11.0	11-11-82
CBS-05	clear	•	8.2	0.2	140.	12.8	10-19-82
CBS-05	light brown	turbid	6.3	0.2	· 87.	12.8	11-4-82
CBS-06	gray/brown	turbid	6.6	1.0	1100.	10.2	10-21-82
CBS-06	clear	slightly	6.4	1.0	1110.	9.5	11-11-82
CBS-07	brown	slightly	9.4	0.5	220.	12.5	10-19-82
CBS-07	light brown	turbid	7.4	0.4	210.	12.2	11-4-82
CBS-08	dark gray	very silty	6.6	1.0	1100.	11.8	10-21-82
CBS-08	dark gray	-	6.4	1.0	1090.	11.0	11-11-82
CBS-09	gray	slightly	6.1	0.3	290.	11.5	10-21-82
CBS-09	clear	slightly	6.0	0.5	292.	10.0	11-11-82
CBS-10	clear	-	7.8	0.5	270.	12.0	10-19-82
CBS-10	clear	-	-	-	-	-	-
CBS-11	clear	-	6.6	0.5	330.	11.8	10-19-82
CBS-11	light brown	slightly	6.5	0.4	319.	11.8	11-4-82
CBS-12	brown	slightly	6.3	0.3	165.	· 13.0	10-21-82
CBS-12	clear	slightly	6.4	0.3	125.	11.8	11-10-82
CBS-13	clear	-	7.1	0.6	457.	11.2	11-4-82
CBS-13	gray	slightly	11.2	1.0	1120.	10.3	11-16-82
CBS-13	clear	slightly	10.7	0.3	431.	12.1	11-30-82

^{*} parts per thousand
** micromhos per centimeter

Soil Sampling

Surface soil samples were obtained from the nine locations outlined in Table 1 and shown on Figure 1. Two samples were obtained from each location (one sample at the surface and the second sample at a depth of 1 foot). The samples were taken using a shovel and were placed in 16-ounce glass jars. The shovel was decontaminated between each sample using the procedure outlined in the sampling plan. Samples were then packaged and shipped to the EPA contract laboratories for analysis. The detected priority pollutant organics, metals and inorganics analyses are presented in Table A-4 of Appendix A.

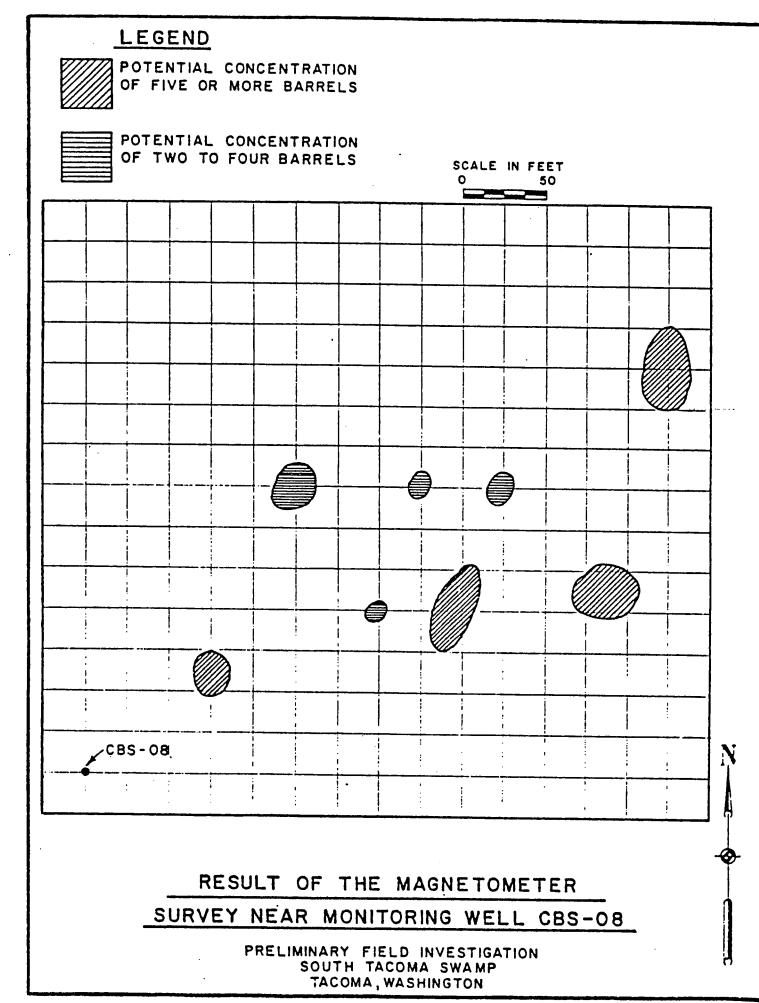
Subsurface soil samples were obtained from each well boring as previously described. The samples were extruded and placed in 16-ounce glass jars. Approximately 15 minutes after placement in the jars, the tops were removed and an OVA reading was taken in the head space above the jars. The two samples with the highest OVA readings were sent to the EPA contract laboratories for analysis. The summary of the detected priority pollutant organics, metals, and inorganics for the subsurface soil samples is presented in Table A-5 of Appendix A.

Magnetometer Survey

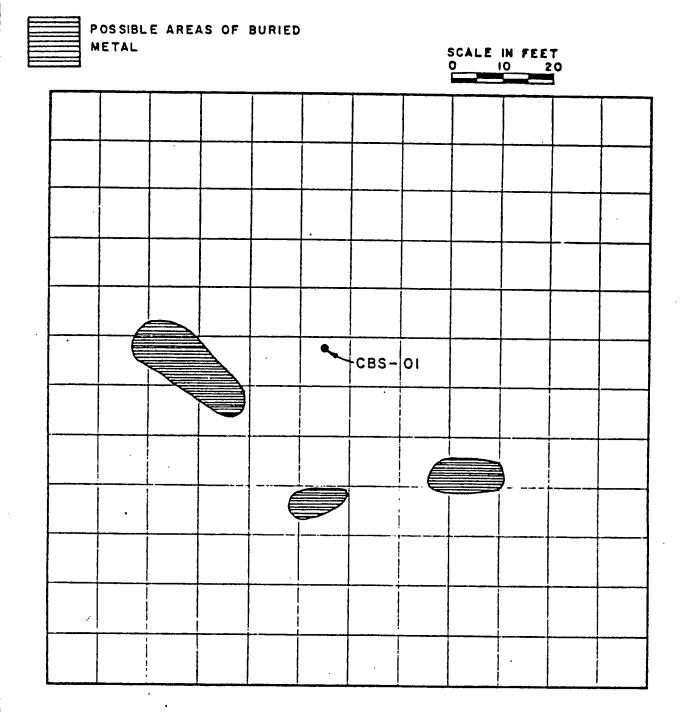
A magnetometer survey was performed in the vicinity of well locations CBS-08, 01, 02, 03, 06, and 09 using a Geometrics Instruments Model G-856 Proton Precession Magnetometer.

The magnetometer was used to determine the location of buried metallic objects in the fill area near well location CBS-08 and to determine if buried metals were present at the sites of borings CBS-01, 02,

03, 06, and 09. The area in the vicinity of well location CBS-08 has been backfilled with construction debris and industrial by-products. There are several unopened 55-gallon metal drums which lie on the surface of the fill and appear to be full. The drums are badly rusted and are deteriorating. Several of the drums have "Used Solvents" written on their sides. The magnetometer survey near CBW-08 was conducted over an area 375 by 425 feet, as shown in Figure 4. Seven areas were identified where there is a high probability of the presence of buried metals, three of which had readings that would be indicative of the presence of large quantities of buried metals. If the buried metal at these locations was in the form of 55-gallon drums, the readings indicate a potential concentration of five or more drums at these locations. Similarly, the readings at the remaining four locations indicate the presence of potential concentrations of two to four drums. No buried metals were detected at locations CBS-03, 06, and 02. Buried metals were detected in the vicinity of well locations CBS-01 and 02 but were far enough away that they did not present a hazard to drilling. The locations of the buried metals for well locations CBS-01 and 02 are presented in Figures 5 and 6, respectively.



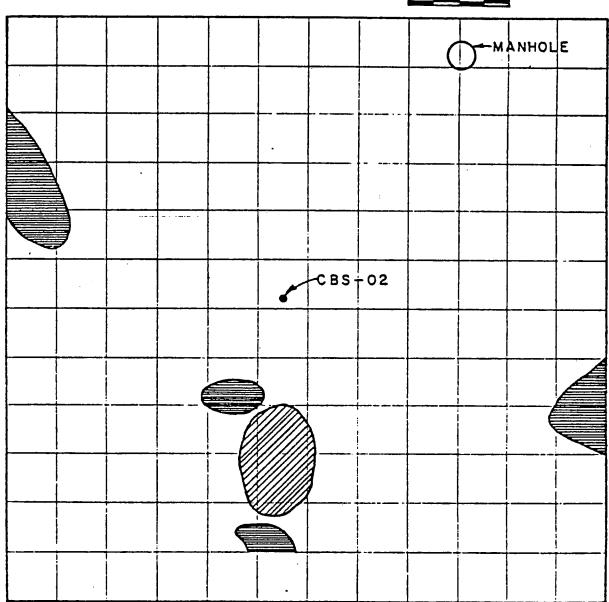
LEGEND



RESULT OF THE MAGNETOMETER
SURVEY NEAR MONITORING WELL CBS-01

PRELIMINARY FIELD INVESTIGATION SOUTH TACOMA SWAMP TACOMA, WASHINGTON

LEGEND SURFACE METAL POSSIBLE AREAS OF BURIED METAL



SCALE IN FEET 10

20

RESULT OF THE MAGNETOMETER SURVEY NEAR MONITORING WELL CBS-02

PRELIMINARY FIELD INVESTIGATION SOUTH TACOMA SWAMP TACOMA, WASHINGTON

APPENDIX A

SAMPLE ANALYSES

SOUTH TACOMA SWAMP

PRELIMINARY SITE INVESTIGATION

DETECTION LIMIT SUMMARY AND SAMPLE ANALYSES NOMENCLATURE

- 1) SMO: EPA Sample Management Office, Region 10
- 2) B&V: BLACK & VEATCH Engineers-Architects
- 3) CBS: Commencement Bay South Tacoma Swamp
- B&V Sample No.: Sample number designation in accordance with the B&V sampling manual. The sample designation consists of the station designation, a two-letter sample media code, and a two-digit sequence number. Sample media codes applicable to South Tacoma Swamp (CBS) sampling efforts are:
 - GW Ground water
 - SW Surface water
 - SL Surface soil
 - SS Subsurface soil

Example sample designations are:

CBS-03-SS-02 Second subsurface soil sample at station CBS-03

CBS-07-GW-01 First ground-water sample at station CBS-07

- DETECTION LIMIT REFERENCE NUMBER: Parenthesized numbers on sample analyses Tables A-2 through A-6 which serve as a cross-reference with the Detection Limit Summary (Table A-1). Table A-1 lists the EPA contract laboratories which performed the analyses and their respective detection limits.
- 6) Units definition:

ug/l = micrograms per liter

mg/l = miligrams per liter

ug/Kg = micrograms per Kilogram

mg/Kg = miligrams per Kilogram ug/g = micrograms per gram

ppm = parts per million

ppb = parts per billion

TABLE A-1

SOUTH TACOMA SWAHP
PRELIMINARY SITE INVESTIGATION
DETECTION LIMIT SUMMARY - ORGANICS

LABORATORY NAME	HEAD	MEAD	HEAD	VCTS	VCTS	WCTS
CONCENTRATION DESCRIPTION	LL	ዘጌ	нL	LL	LL	LL
SAMPLE TYPE	Solid	Solid	Solid	Vater	Water	Water
DETECTION LIMIT REFERENCE NO.	(1)	(2)	(3)	(4)	(5)	(6)
	(ug/kg	(ug/g	(ug/g	(ug/1)	(ug/1)	(mg/1)
Acid Compounds	or ppb)	or ppm)	or ppm)	_		
	• • •					
2,4,6-trichlorophenol	400	10	10	2	4	10
p-chloro-m-cresol	400	20	20	2	4	10
2-chlorophenol	400	10	10	2	4	10
2.4-dichlorophenol	400	10	10	2	4.	10
2,4-dimethylphenol	400	10	10	2	4	10
2-nit cophenol	800	20	20	2	4	10
4-mit cophenol	4000	100	100	2	4	10
2,4-dinitrophenol	2000	50	50	2	4	10
4,6-dinitro-o-cresol	800	20	20	2	4	10
pentachlorophenol	800	20	20	2	4	10
phenol	400	10	10	2	4	10
(Non-Priority Pollutants)						
benzoic acid	4000	100	100	2	4	10
2-methylphenol	400	10	10	2	4	10
4-methylphenol	400	10	10	2	4	10
2,4,5-trichlorophenol	4000	100	100	2	4	10
Base/Neutral Compounds						
acepaphthene	400	10	10	2.	4	10
benzidine	1600	40	40	2	4	10
1,2,4-trichlorobenzene	400	10	10	2	4	10
bezachlorobenzene	400	10	10	2	4	10
hexachloroethane	400	10	10	2	4	10
bis (2-chloroethyl)ether	400	10	10	2	4	10
2-chloronaphthalene	400	10	10	2	4	10
1,2-dichlorobenzene	400	10	10	2	4	10

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BLACK & VEATCH KANSAS CITY, HO page 1 of 8

U.S. ENVIRONMENTAL PROTECTION AGENCY EPA CONTRACT NO. 68-03-1614 WORK ASSIGNMENT NO. Z-3-6

TABLE A-1

SOUTH TACOMA SWAMP
PRELIMINARY SITE INVESTIGATION
DETECTION LIMIT SUPPARY - ORGANICS
(Continued)

CONCENTRATION DESCRIPTION LL ML ML LL LL LL SAHPLE TYPE Solid Solid Solid Water Water Water Water DETECTION LIMIT REFERENCE NO. (1) (2) (3) (4) (5) (6) (ug/kg (ug/kg (ug/g (ug/g (ug/g (ug/g (ug/l)	LABORATORY NAME	HEAD	MEAD	MEAD	WCTS	WCTS	WCTS
SAMPLE TYPE DETECTION LIMIT REFERENCE NO.	CONCENTRATION DESCRIPTION	LL.	HL	ML			
DETECTION LIMIT REFERENCE NO.	SAMPLE TYPE	Solid	Solid	Solid			_
	DETECTION LIMIT REFERENCE NO.	(1)	(2)	(3)			
1,3-dichlorobenzene		7 -					, .
1,3-dichlorobenzene 400 10 10 2 4 10 10 2,4-dichlorobenzene 400 10 10 2 4 10 2,4-dichlorobenzidine 800 20 20 20 2 4 10 2,6-dinitrotoluene 800 20 20 20 2 4 10 2,6-dinitrotoluene 800 20 20 20 2 4 10 1,2-diphenylhydrazine 800 20 20 20 2 4 10 10 1,2-diphenylhydrazine 800 20 20 20 2 4 10 10 10 10 2 4 10 4-chlorophenyl phenyl ether 400 10 10 10 2 4 10 4-chlorophenyl phenyl ether 400 10 10 2 4 10 bis (2-chloroisopropyl) ether 800 20 20 20 2 4 10 bis (2-chloroisopropyl) ether 800 20 20 2 4 10 bis (2-chloroisopropyl) ether 800 20 20 2 4 10 hexachlorobutadiene 400 10 10 2 4 10 hexachlorocyclopentadiene 400 10 10 2 4 10 isophorone 400 10 10 2 4 10 isophorone 400 10 10 2 4 10 nitrobenzene 400 10 10 2 4 10 nitrobenzene 400 10 10 2 4 10 hritrosodimethylamine 400 10 10 2 4 10 N-nitrosodimethylamine 400 10 10 2 4 10 Dickethyl phthalate 400 10 10 2 4 10 Dickethyl phth	Base/Neutral Compounds				(-8/-)	(-8/-/	(-6/1/
1,4-dichlorobenzene 400 10 10 2 4 10 3,3-dichlorobenzidine 800 20 20 20 2 4 10 2,4-dinitrotoluene 800 20 20 20 2 4 10 2,6-dinitrotoluene 800 20 20 20 2 4 10 11,2-diphenylhydrazine 800 20 20 2 4 10 10 1,2-diphenylhydrazine 800 20 20 2 4 10 10 10 10 10 10 10 10 10 10 10 10 10		•	•••	•• •			
3,3-dichlorobenzidine		400	10	10	2	4	10
3,3-dichlorobenzidine		400	10	10		4	
2,4-dinitrotoluene 800 20 20 2 4 10 2,6-dinitrotoluene 800 20 20 2 4 10 1,2-diphenylhydrazine 800 20 20 2 4 10 (as azobenzene) fluoranthene 400 10 10 2 4 10 4-chlorophenyl phenyl ether 400 10 10 2 4 10 bis (2-chloroisopropyl) ether 800 20 20 2 4 10 bis (2-chloroethoxy) methane 800 20 20 2 4 10 bis (2-chloroethoxy) methane 800 20 20 2 4 10 bexachlorobutadiene 400 10 10 2 4 10 hexachlorocyclopentadiene 400 10 10 2 4 10 isophorone 400 10 10 2 4 10 nitrobenzene 400 10 10 2 4 10 nitrosodimethylamine 400 10 10 2 4 10 N-nitrosodiphenylamine 400 10 10 2 4 10 N-nitrosodiphenylamine 800 20 20 20 2 4 10 N-nitrosodin-propylamine 800 20 20 2 4 10 N-nitrosodin-propylamine 800 20 20 2 4 10 N-nitrosodiphenylamine 400 10 10 2 4 10 M-nitrosodiphenylamine 400 10 10 2 4 10 M-nitrosodiphenylamine 400 10 10 2 4 10 Minitrosodiphenylamine 400 10 10 2 4 10 Minitrosodiphenylamine 800 20 20 20 2 4 10 Minitrosodiphenylamine 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene 400 10 10 2 4 10	3,3-dichlorobenzidine	.800	20	20		4	-
2,6-dinitrotoluene 800 20 20 2 4 10 1,2-diphenylhydrazine 800 20 20 2 4 10 (as azobenzene) fluoranthene 400 10 10 2 4 10 4-chlorophenyl phenyl ether 400 10 10 2 4 10 bis (2-chloroisopropyl) ether 800 20 20 2 4 10 bis (2-chloroethoxy) methane 800 20 20 2 4 10 bezachlorocyclopentadiene 400 10 10 10 2 4 10 bezachlorocyclopentadiene 400 10 10 2 4 10 isophorone 400 10 10 2 4 10 naphthalene 400 10 10 2 4 10 nitrobenzene 400 10 10 2 4 10 N-nitrosodimethylamine 400 10 10 2 4 10 N-nitrosodimethylamine 400 10 10 2 4 10 N-nitrosodin-propylamine 800 20 20 2 4 10 N-nitrosodin-propylamine 800 20 20 2 4 10 N-nitrosodin-propylamine 800 20 20 2 4 10 N-nitrosodiphenylamine 400 10 10 2 4 10 N-nitrosodiphenylamine 400 10 10 2 4 10 M-nitrosodiphenylamine 800 20 20 2 4 10 M-nitrosodiphenylamine 800 20 20 2 4 10 M-nitrosodiphenylamine 800 20 20 2 4 10 M-nitrosodiphenylamine 800 10 10 2 4 10 di-n-butyl benzyl phthalate 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene 400 10 10 2 4 10	2,4-dinitrotoluene	800	20	20	2	4	• -
1,2-diphenylhydrazine (as azobenzene) fluoranthene 4-chlorophenyl phenyl ether 400 10 10 2 4 10 4-chromophenyl phenyl ether 400 10 10 2 4 10 bis (2-chloroisopropyl) ether 800 20 20 2 4 10 bis (2-chloroethoxy) methane 800 20 20 2 4 10 bexachlorobutadiene 400 10 10 2 4 10 hexachlorocyclopentadiene 400 10 10 2 4 10 naphthalene 400 10 10 10 2 4 10 naphthalene 400 10 10 10 2 4 10 nitrobenzene 400 10 10 2 4 10 N-nitrosodimethylamine 400 10 10 2 4 10 N-nitrosodien-propylamine 800 20 20 2 4 10 N-nitrosodi-n-propylamine 800 20 20 2 4 10 bis (2-ethylbexyl) phthalate 400 10 10 2 4 10 butyl benzyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10	2,6-dinitrotoluene	800	20	20	2	4	
Sample S	1,2-diphenylhydrazine	800	20	20	2	4	
4-chlorophenyl phenyl ether 400 10 10 2 4 10 4-bromophenyl phenyl ether 400 10 10 10 2 4 10 bis (2-chloroisopropyl) ether 800 20 20 2 4 10 bis (2-chloroethoxy) methane 800 20 20 2 4 10 hexachlorobutadiene 400 10 10 2 4 10 hexachlorocyclopentadiene 400 10 10 2 4 10 isophorone 400 10 10 2 4 10 nitrobenzene 400 10 10 2 4 10 N-nitrosodimethylamine 400 10 10 2 4 10 N-nitrosodiphenylamine 400 10 10 2 4 10 N-nitrosodi-n-propylamine 800 20 20 2 4 10 M-nitrosodi-n-propylamine 800 20 20 2 4 10 bis (2-ethylhexyl) phthalate 400 10 10 2 4 10 butyl benzyl phthalate 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-n-cycly phthalate 400 10 10 2 4 10 di-n-cycly phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene	(as azobenzene)						-
4-chlorophenyl phenyl ether 400 10 10 2 4 10 4-bromophenyl phenyl ether 400 10 10 2 4 10 bis (2-chloroisopropyl) ether 800 20 20 2 2 4 10 bis (2-chloroethoxy) methane 800 20 20 2 2 4 10 bexachlorobutadiene 400 10 10 10 2 4 10 isophorone 400 10 10 2 4 10 naphthalene 400 10 10 10 2 4 10 nitrobenzene 400 10 10 2 4 10 N-nitrosodimethylamine 400 10 10 2 4 10 N-nitrosodiphenylamine 400 10 10 2 4 10 M-nitrosodi-n-propylamine 800 20 20 2 4 10 bis (2-ethylhexyl) phthalate 400 10 10 2 4 10 butyl benzyl phthalate 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10	fluoranthene	400	10	10	2	4	10
## A-bromophenyl phenyl ether ## 400 ## 10	4-chlorophenyl phenyl ether	400	10	10	2	4	
bis (2-chloroisopropyl) ether 800 20 20 2 4 10 bis (2-chloroethoxy) methane 800 20 20 2 4 10 hexachlorobutadiene 400 10 10 2 4 10 hexachlorocyclopentadiene 400 10 10 2 4 10 hexachlorocyclopentadiene 400 10 10 2 4 10 isophorone 400 10 10 2 4 10 naphthalene 400 10 10 2 4 10 nitrobenzene 400 10 10 2 4 10 N-nitrosodimethylsmine 400 10 10 2 4 10 N-nitrosodi-n-propylamine 800 20 20 2 4 10 M-nitrosodi-n-propylamine 800 20 20 2 4 10 bis (2-ethylhexyl) phthalate 400 10		400	10	10	2	4	
bis (2-chloroethoxy) methane 800 20 20 2 4 10 hexachlorobutadiene 400 10 10 2 4 10 hexachlorocyclopentadiene 400 10 10 2 4 10 isophorone 400 10 10 2 4 10 maphthalene 400 10 10 2 4 10 nitrobenzene 400 10 10 2 4 10 N-nitrosodimethylamine 400 10 10 2 4 10 N-nitrosodiphenylamine 400 10 10 2 4 10 N-nitrosodi-n-propylamine 800 20 20 2 4 10 M-nitrosodi-n-propylamine 800 20 20 2 4 10 bis (2-ethylhexyl) phthalate 400 10 10 2 4 10 butyl benzyl phthalate 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene 400 10 10 2 4 10	bis (2-chloroisopropyl) ether	800	20	20	2	4	
bexachlorobutadiene 400 10 10 2 4 10 hexachlorocyclopentadiene 400 10 10 2 4 10 isophorone 400 10 10 2 4 10 naphthalene 400 10 10 2 4 10 nitrobenzene 400 10 10 2 4 10 N-nitrosodimethylamine 400 10 10 2 4 10 N-nitrosodi-n-propylamine 800 20 20 2 4 10 M-nitrosodi-n-propylamine 800 20 20 2 4 10 bis (2-ethylbexyl) phthalate 400 10 10 2 4 10 butyl benzyl phthalate 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-noctyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10<	bis (2-chloroethoxy) methane	800	20	20		4	
hexachlorocyclopentadiene 400 10 10 2 4 10 isophorone 400 10 10 10 2 4 10 naphthalene 400 10 10 10 2 4 10 nitrobenzene 400 10 10 10 2 4 10 N-nitrosodimethylamine 400 10 10 10 2 4 10 N-nitrosodiphenylamine 400 10 10 2 4 10 N-nitrosodi-n-propylamine 800 20 20 2 4 10 N-nitrosodi-n-propylamine 800 20 20 2 4 10 bis (2-ethylbexyl) phthalate 400 10 10 2 4 10 butyl benzyl phthalate 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10		400	10	10	2	4	
naphthalene 400 10 10 2 4 10 nitrobenzene 400 10 10 2 4 10 N-mitrosodimethylamine 400 10 10 2 4 10 M-nitrosodi-n-propylamine 800 20 20 2 4 10 bis (2-ethylbexyl) phthalate 400 10 10 2 4 10 butyl benzyl phthalate 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-noctyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 disethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene 400 10 10 2 4 10	hexachlorocyclopentadiene	400	10	10		4	
nitrobenzene 400 10 10 2 4 10 N-mitrosodimethylamine 400 10 10 2 4 10 N-mitrosodi-n-propylamine 800 20 20 2 4 10 M-mitrosodi-n-propylamine 800 20 20 2 4 10 bis (2-ethylbexyl) phthalate 400 10 10 2 4 10 butyl benzyl phthalate 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene 400 10 10 2 4 10	isophorone	400	10	10	2	4	
N-mitrosodimethylamine 400 10 10 2 4 10 N-nitrosodiphenylamine 400 10 10 2 4 10 M-nitrosodi-n-propylamine 800 20 20 2 4 10 bis (2-ethylbexyl) phthalate 400 10 10 2 4 10 butyl benzyl phthalate 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene 400 10 10 2 4 10	naphthalene	400	10	10	2	4	10
N-nitrosodiphenylamine 400 10 10 2 4 10 N-nitrosodi-n-propylamine 800 20 20 2 4 10 bis (2-ethylhexyl) phthalate 400 10 10 2 4 10 butyl benzyl phthalate 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene 400 10 10 2 4 10		400	10	10	2	4	10
M-nitrosodi-n-propylamine 800 20 20 2 4 10 bis (2-ethylbexyl) phthalate 400 10 10 2 4 10 butyl benzyl phthalate 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene 400 10 10 2 4 10	N-mitrosodimethylamine	400	10	10	2	4	10
bis (2-ethylbexyl) phthalate 400 10 10 2 4 10 butyl benzyl phthalate 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene 400 10 10 2 4 10		400	10	10	2	4	10
butyl benzyl phthalate 400 10 10 2 4 10 di-n-butyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene 400 10 10 2 4 10	M-mitrosodi-n-propylamine	800	20	20	2	4	10
di-n-butyl phthalate 400 10 10 2 4 10 di-n-octyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene 400 10 10 2 4 10	bis (2-ethylbexyl) phthalate	400	10	10	2	4	10
di-n-octyl phthalate 400 10 10 2 4 10 diethyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene 400 10 10 2 4 10		400	10	10	2	4	10
dietbyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene 400 10 10 2 4 10	di-m-butyl phthalate	400	10	10	2	4	10
diethyl phthalate 400 10 10 2 4 10 dimethyl phthalate 400 10 10 2 4 10 benzo(a)anthracene 400 10 10 2 4 10	di-n-octyl phthalate	400	10	10	2	4	10
benzo(a)anthracene 400 10 10 2 4 10	diethyl phthalate	400	10	10	2	4	
benzo(a)anthracene 400 10 10 2 4 10	dimethyl phthalate	400	10	10	2	4	
benzo(a)pyrene 800 20 20 2 4 10		400	10	10	2	4	
	benzo(a)pyrene	800	20	20	2	4	

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BLACK & VEATCH KANSAS CITY, HO Page 2 of 8

TABLE A-1

SOUTH TACOMA SWAMP
PRELIMINARY SITE INVESTIGATION
DETECTION LIMIT SUPMARY - ORGANICS
(Continued)

LABORATORY NAME CONCENTRATION DESCRIPTION SAMPLE TYPE	MEAD LL Solid	HEAD HL Solid	MEAD ML Solid	WCTS LL Water	WCTS LL Water	WCTS LL Water	
DETECTION LIMIT REFERENCE NO.	(1)	(2)	(3)	(4)	(5)	(6)	
Base/Neutral Compounds	(ug/kg or ppb)	(ug/g or ppm)	(ug/g or ppm)	(u g /1)	(ug/l)	(mg/l)	
3,4-benzo fluoranthene	800	20	20	2	4	10	
benzo(k)fluoranthene	800	20	20	2	4	10	
chrysene	400	10	10	2	4	10	
acenaphthylene	400	10	10	2	4	10	
anthracene	400	10	10	2	4	10	
benzo(ghi)perylene	800	20	20	2	4	10	
fluorene	400	10	10	2	4	10	
phenanthrene	400	10	10	2	4	10	
dibenzo(a,h)anthracene	800	20	20		4	10	
indeno(1,2,3-cd)pyrene	800	20	20	2 2	4	10	
pyrene	400	10	10	2	4	10	
2,3,7,8-tetrachlorodibenzo- p-dioxin	0.08	0.08	0.002	0.007	0.010	.000007	
(Non-Priority Pollutants)							
anlilne	· 400	10	10	2 .	4	10	
benzył alcohol	800	20	20	2	4	10	
4-chloraniline	2000	50	50	2	4	10	
dibenzofuran	400	10	10	2	4	- 10	
2-methylnaphthalene	800	20	20	2	4	10	
2-nitrosniline	4000	100	100	2	4	10	
3-nitrosniline	4000	100	100	2	4	10	
4-nitrosniline	4000	100	100	2 .	4	10 .	

Footnotes on page 6 of 8

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TABLE A-1

SOUTH TACOMA SWAMP
PRELIMINARY SITE INVESTIGATION
DETECTION LIMIT SUMMARY - ORGANICS
(Continued)

LABORATORY NAME CONCENTRATION DESCRIPTION SAMPLE TYPE	MEAD LL Solid	MEAD HL Solid	MEAD HL Solid	WCTS LL Water	WCTS LL Water	WCTS LL Water
Volatiles	(1) (ug/kg or ppb)	(2) (ug/kg or ppb)	(3) (ug/kg or ppb)	(4) (ug/1)	(5) (ug/l)	(6) (ug/1)
acrolein	50	50	50	1	10	1
acrylonitrile	50	50	50	1	10	1
benzene	2.5	2.5	2.5	1	10	1
carbon tetrachloride	2.5	2.5	2.5	1	10	1
chlorobenzene	2.5	2.5	2.5	i	10	1
1,2-dichloroethane	2.5	2.5	2.5	i	10	1
1,1,1-trichloroethane	2.5	2.5	2.5	1	10	i
I, I-dichloroethane	2.5	2.5	2.5	ì	10	1
1.1.2-trichloroethane	2.5	2.5	2.5	1	10	t
1,1,2,2-tetrachloroethane	2.5	2.5	2.5	i ·	10	ì
chloroethane	2.5	2.5	2.5	1	10	1
bis(chloromethyl)ether	na	na .	Da	1	10	1
2-chloroethylvinyl ether	2.5	2.5	2.5	i	10	1
chloroform	2.5	2.5	2.5	i	10	i
1,1-dichloroethylene	2.5	2.5	2.5	. 1	10	1
1.2-trans-dichloroethylene	2.5	2.5	2.5	i	10	1
1.2-dichloropropane	D&	Dě	Da	1	10	1
1,3-dichloropropylene	2.5	2.5	2.5	1	10	1
ethylbenzene	2.5	2.5	2.5	1	10	. 1
methylene chloride	2.5	2.5	2.5	1	10	1
methyl chloride	2.5	2.5	2.5	1	10	1
methyl bromide	2.5	2.5	2.5	1	10	1
bromoform	2.5	2.5	2.5	1	10	1
dichlorobromomethane	2.5	2.5	2.5	1	10	1
trichlorofluoromethane	2.5	2.5	2.5	1	10	1
dichlorodifluoromethane	n.a	n.a	na	1	10	1
chlorodibromomethane	2.5	2.5	2.5	1	10	1
tetrachloroethylene	2.5	2.5	2.5	1	10	1

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TABLE A-1

SOUTH TACOHA SWAMP
PRELIMINARY SITE INVESTIGATION
DETECTION LIMIT SUMMARY - ORGANICS
(Continued)

LABORATORY NAME CONCENTRATION DESCRIPTION SAMPLE TYPE DETECTION LIMIT REFERENCE NO. Volatiles	MEAD LL Solid (1) (ug/kg or ppb)	MEAD HL Solid (2) (ug/kg or ppb)	HEAD HL Solid (3) (ug/kg or ppb)	WCTS LL Water (4) (ug/1)	WCTS LL Water (5) (ug/1)	WCTS LL Water (6) (ug/1)
toluene	2.5	2.5	2.5	1	10	1
trichloroethylene	2.5	2.5	2.5	1	10	1
vinyl chloride	2.5	2.5	2.5	1	10	1
(Non-Priority Pollutants)						
acetone	50	50	50	1	1	1
2-butanone	100	100	100	1	1	1
carbondisulfide	5	5	5	1	1	1
2-hexanone	50	50	50	1	1	1
4-methy1-2-pentanone	50	50	50	1	1	1
styrene	2.5	2.5	2.5	1	1	1
vinyl acetate	5	5	5	1	1	1
o-xylene	2.5	2.5	2.5	1	1	1
Pesticides			(ug/g or ppm)			
aldrin	4.0	4.0	0.01	0.1	0.1	0.1
dieldrin	4.0	4.0	0.01	0.1	0.1	0.1
chlordane	4.0	4.0	0.01	0.1	0.1	0.1
4,4'-DDT	4.0	4.0	0.01	0.1	0.1	0.1
4,4'-DUE	4.0	4.0	0.01	0.1	0.1	0.1
4,4'-DDD	4.0	4.0	0.01	0.1	0.1	0.1
alpha-endosulfan	4.0	4.0	0.01	0.1	0.1	0.1
beta-endosul fan	4.0	4.0	0.01	0.1	0.1	0.1
endosulfan sulfate	4.0	4.0	0.01	0.1	0.1	0.1
endrin	4.0	4.0	0.01	0.1	0.1	1.0
endrin aldehyde	4.0	4.0	0.01	0.1	0.1	0.1
beptachlor	4.0	4.0	0.01	0.1	0.1	0.1

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TABLE A-1

SOUTH TACOMA SWAMP
PRELIMINARY SITE INVESTIGATION
DETECTION LIMIT SUMMARY - ORGANICS
(Continued)

LABORATORY NAME CONCENTRATION DESCRIPTION SAMPLE TYPE	HEAD LL Solid	HEAD HL Solid	MEAD ML Solid	WCTS LL Water	WCTS LL Water	WCTS LL Water
DETECTION LIMIT REFERENCE NO.	(1) (ug/kg	(2) (ug/kg	(3) (ug/g	(4) (ug/l)	(5) (ug/l)	(6) (ug/l)
Pesticides	or ppb)	or ppm)	or ppm)	(-8/ 1)	(08/1/	(48/1)
heptachlor epoxide	4.0	4.0	0.01	0.1	0.1	0.1
alpha-BHC	4.0	4.0	0.01	0.1	0.1	0.1
beta-BHC	4.0	4.0	0.01	0.1	0.1	0.1
gamma-BIIC	4.0	4.0	0.01	0.1	0.1	0.1
delta-BIIC	4.0	4.0	0.01	0.1	0.1	0.1
PCB-1242	4.0	4.0	0.01	0.1	0.1	0.1
PCB-1254	4.0	4.0	0.01	0.1	0.1	0.1
PCB-1221	4.0	4.0	0.01	0.1	0.1	0.1
PC8-1232	4.0	4.0	0.01	0.1	0.1	0.1
PCB-1248	4.0	4.0	0.01	0.1	0.1	0.1
PC8-1260	4.0	4.0	0.01	0.1	0.1	0.1
PCB-1016	4.0	4.0	0.01	0.1	0.1	0.1
toxaphene	4.0	4.0	0.01	0.1	0.1	0.1

LL-Low level (expected concentrations up to 10 ppm)
HL-Medium level (expected concentrations up to 150,000 ppm)
na-Not analyzed by specific laboratory
MEAD-Mead CompuChem
WCTS-West Coast Technical Service, Inc.

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TABLE A-1

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SOUTH TACOMA SWAMP PRELIMINARY SITE INVESTIGATION DETECTION LIMIT SUMMARY - INORGANICS AND OTHER POLLUTANTS

LABORATORY NAME	CAL	RMA
LEVEL OF ANALYSES	LL	LL
SAMPLE TYPE	Water	Soil
DETECTION LIMIT REFERENCE NO.	(11)	(12)
	(ug/1)	(mg/kg
Inorganics		or ppm)
Silver (Ag)	10	1
Aluminum (Al)	200	20
Boron (B)	100	10
Barium (Ba)	100	10
Beryllium (Be)	5	0.5
Chromium (Cr)	10	3
Cobalt (Co)	50	5
Copper (Cu)	50	5
Iron (Fe)	50	5
Manganese (Mm)	15	1
Nickel (Ni)	40 -	4
Vanadium (V)	200	20
Zinc (Zn)	10	ı
Arsenic (As)	10	1
Cadmium (Cd)	1	0. t
Hercury (Hg)	0.2	0.02
Lead (Pb)	5	0.5
Antimony (Sb)	20	2
Selenium (Se)	2	0.2
Tin (Sn)	20	2
Thallium (TI)	10	1
Cyanide (Cn)	10	1
Asbestos	0.6	na

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TABLE A-1

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SOUTH TACOMA SWAMP RELIMINARY SITE INVESTIGATION DETECTION LIMIT SURMARY - INORGANICS AND OTHER POLLUTANTS (Continued)

CAL	RHA
LL	LL
Water	Soil
(11)	(12)
(ug/i)	(mg/kg
	or ppm)
50	5
100	10
1000	3000
10	. 100
De	10
na	10
D.O.	50
	LL Water (11) (ug/1) 50 100 1000 10 na na

RMA-Rocky Mountain Analytical CAL-California Analytical Laboratories, Inc. na-Not analyzed by specific laboratory LL-Low level ML-Medium Level

TABLE A-2 SOUTH TACOMA SWANP PRELIMINARY SITE INVESTIGATION SURFACE-WATER ANALYSES

BLACK & VEATCH KANSAS CITY, MO Page 1 of 2

SHO TRAFFIC NOS. BEV SAMPLE NO.	T1374/ HT9470 CBS-14- SW-01	T1375/ HT9471 CBS-15- SW-01	T1376/ HT9472 CBS-16- SW-01	T1377/ HT9473 CBS-17- SW-01	T1378/ HT9474 CBS-18- SW-01	T1379/ HT9475 CBS-19- SW-01	T1380/ HT9476 CBS-20- SW-01	T1381/ HT9477 CBS-21- SW-01	T1382/ HT9478 CBS-22- SW-01	T1383/ HT9430 CBS-23- SW-01
DATE SAMPLED DETECTION LIMIT REFERENCE NO.	10-22-82	10-22-82	10-22-82	10-22-82	10-25-82	10-25-82	10-25-82	10-25-82	10-25-82	10-25-82 (4)
Base/Neutral Compounds						(ug/l)				
1,2-diphenylhydrazine (as azobenzene)	bn	nd	nd	nd	nd	3.1*	nd	nd	nd	nd
bis (2-ethylbexyl) phthalate	nd	3.3*	1.2*	1.0*	nđ	nd .	nd	nd	nd	nd
Volatiles		•								
l,l,l-trichloroethane methylene chloride trichlorofluoromethane	nd 8.6* nd	8.4* 28 18	nd 9.7* ad	nd 9.0* nd	nd 5.2* nd	nd 5.3* nd	nd 5.6* nd	nd 6.3* nd	nd 4.6* nd	nd 4.8* nd
DETECTION LIMIT REFERENCE NO.	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
Inorganics										
Aluminum (A1) Boron (B) Barium (Ba) Iron (Fe) Hanganese (Hn) Zinc (Zn) Cadmium (Cd) Lead (Pb) Cyanide (CN)	460 320 nd 470 28 100 nd 29	260 370 nd 270 27 100 nd 14	nd 190 nd 240 27 65 nd 14	230 180 nd 270 24 77 nd 17	nd 870 nd 390 27 110 nd nd	nd 820 nd 810 57 160 nd nd	nd 830 nd 780 66 85 nd nd	nd 890 nd 880 350 280 nd nd	280 1700 220 470 29 51 nd nd	nd 150 nd nd nd 16 14 nd
alenine foul	• •	. •	• •	• *	11.0	ard.	H.A.	114		HU

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TABLE A-2 SOUTH TACOMA SWAMP PRELIMINARY SITE INVESTIGATION SURFACE-WATER ANALYSES (Continued)

BLACK & VEATCH KANSAS CITY, HO Page 2 of 2

SHO TRAFFIC NOS.	T1374/ HT9470	T1375/ HT9471	T1376/ HT9472	T1377/ HT9473	T1378/ HT9474	T1379/ HT9475	T1380/ HT9476	T1381/ HT9477	T1382/ HT9478	T1383/ HT9430
B&V SAMPLE NO.	CBS-14- SW-01	CBS-15- SW-01	CBS-16- SW-01	CBS-17- SW-01	CBS-18- SW-01	CBS-19- SW-01	CBS-20- SW-01	CBS-21- SW-01	CBS-22- SW-01	CRS-23- SW-01
DATE SAMPLED	10-22-82	10-22-82	10-22-82	10-22-82	10-25-82	10-25-82	10-25-82	10-25-82	10-25-82	10-25-82
DETECTION LIMIT REFERENCE NO.	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
Other Pollutants						(ug/l)				
Sulfide	210	nd	nd	nd	330	360	180	130	nd	nd
Ammonia	nđ	ba	bn	nd	400	520	400	640	nd	bn
						(mg/l)				
Chlorides	37	38	41	41	66	66	78	255 .	47	13
Nitrate-N	.03	bn	.03	. 02	nd	0.2	0.92	0.99	1.0	nd

*-Below quantitation limit ud-Not detected 1-Detected in laboratory blanks All other priority pollutants not detected

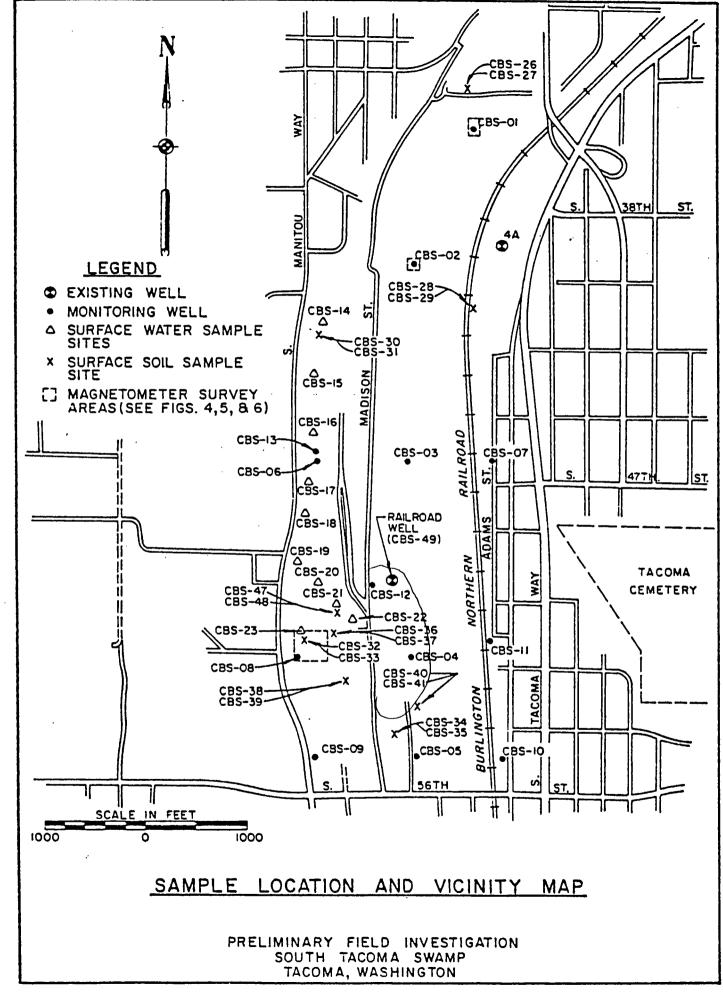


TABLE A-3 SOUTH TACOMA SWAMP PRELIMINARY SITE INVESTIGATION GROUND-WATER ANALYSES

BLACK & VEATCH KANSAS CITY, HO Page 1 of 5

SHO TRAFFIC NOS.	T1361/	T1391/	T1362/	T1392/	T1363/	T1393/	T1364/	T1394/	T1365/	T1395/	T1366/	T1396/	T1367
B&V SAMPLE NO.	MT9457 CBS-01-	HT9479 CBS-01	HT9458 CBS-02-	HT9480 CBS-02-	HT9459 CBS-03-	HT9481 CBS-03-	MT9460 CBS-04-	MT9482 CBS-04-	MT9461 CBS-05-	MT9483 CBS-05-	HT9462 CBS-06-	MT9484 CBS-06-	MT9463 CBS-07-
	GW-01	GW-02	GW-01	GW-02	GW-01	GW-02	GW-01	GW-02	GW-01	CW-02	GW-01	GW-02	GW-01
DATE SAMPLED	10-20-82	11-10-82			10-20-82	11-10-82	10-20-82			11-04-82		11-11-82	10-19-8
DETECTION LIMIT REFERENCE NO.	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(5)	(4)	(4)	(4)
Acid Compounds			-	20		(ug/1)							
pentachlorophenol	ba	nd	nd	ba	ba	nd	nd	nd	nd	nd	1.7*	nd	nd
Base/Neutral Compounds	•												
bis (2-ethylhexyl) phthalate	nd	nd	nd	nd	nd	nd	1.4*	nd	nd	nd	5.8*	nd	nd
<u>Volatiles</u>								-					
1,1,1-trichloroethane	nd .	nd	7.7*	nd									
chloroform .	nd	nd	nd	nd	3.9*	nd							
methylene chloride	7.9*	7.5*	21	7.0*	7.6*	7.0*	8.5*	7.1*	5.1*	5.7*	8.2*	6.8*	4.6*
trichlorofluoromethane	nd	nd	nd	16	nd								
trichloroethylene	nd	nd	nd	nd	4.9*	6.9*	2.1*	nd	nd	nd	nd	nd	nd
(Non-Priority Pollutants)													
acetone	nd	nd	89	nd	18	nd	nd	nd	35	152	nd	nd	430
DETECTION LIMIT REFERENCE NO.	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
Inorganics													
Boron (B)	nd	530	nd	1900	nd	960	1000	2000	nd	640	110	800	nd
Copper (Cu)	nd	nd	ba	43	nd	45	nd						
Iron (Fe)	nd	45	nd	88	nd	nd	nd	57	nd	81	290	1100	nd
Manganese (Mn)	nd	42	nd	24	nd	16	nd	nd	nd	nd	260	330	nd
Zinc (Zn)	nd	250	12	180	15	150	nd	160	nd	650	52	150	nd
Cadmium (Cd)	nd	nd	nd	nd	6.5	nd	nd	nd	100	nd	nd	nd	nd
Mercury (Hg)	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.62	nd
Cyanide (CN)	nd	nd	110	nd	ad	nd							

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TABLE A-3 SOUTH TACOHA SWAHP PRELIMINARY SITE INVESTIGATION GROUND-WATER ANALYSES (Continued)

BLACK & VEATCH KANSAS CITY, HO Page 2 of 5

SHO TRAFFIC NOS.	T1361/ HT9457	T1391/ HT9479	T1362/ HT9458	T1392/ HT9480	T1363/ HT9459	T1393/ HT9481	T1364/ HT9460	T1394/ HT9482	T1365/ HT9461	T1395/ HT9483	T1366/ HT9462	T1396/ HT9484	T1367 HT9463
BEV SAMPLE NO.	CBS-01- GW-01	CBS-01 GV-02	CBS-02- GW-01	CBS-02- GW-02	CBS-03- GW-01	CBS-03- GW-02	CBS-04- GW-01	CBS-04- GW-02	CBS-05- GW-01	CBS-05- GW-02	CBS-06-	CBS-06- GW-02	CBS-07-
DATE SAMPLED DETECTION LIMIT REFERENCE NO.	10-20-82	11-10-82	10-20-82	11-10-82	10-20-82	11-10-82	10-20-82	11-11-82	10-19-82	11-4-82	10-21-82	11-11-82	10-19-82
Other Pollutants						(ug/1)							
Ammonia Sulfide	370 70	190 nd	370 nd	440 nd	nd nd	nd nd	200 130	nd nd	nd nd	nd nd	1760 nd	1200 nd	240 nd
chlorides Mirate-M	12 0.03	1.0	4.0 0.08	3.0 2.3	2.0	(mg/l) nd 0.98	1.0	3.0	7.0 0.03	nd O 64	350	430 0.69	6.0

nd-Not detected 1-Detected in laboratory blanks All other priority pollutants not detected * below quantitation limit

TABLE A-3 SOUTH TACOMA SWAMPPRELIMINARY SITE INVESTIGATION GROUND-WATER ANALYSES

BLACK & VEATCH KANSAS CITY, HO Page 3 of 5

## ## ## ## ## ## ## ## ## ## ## ## ##	SHO TRAFFIC NOS.	T1207/	T10/0/	# *****										
Restrict Restrict	SHU TRAFFIC HUS.	T1397/	T1368/	T1398/	T1369/	T1399/	T1370/	T1400/	T1371/	T1401/	T1372/	T1402/	T1373/	T1403/
NATE SAMPLED 11-4-82 10-21-82 11-11-82 10-21-82 11-11-82 10-21-82 11-4-82 10-19-82 11-4-82 10-19-82 11-4-82 10-21-82 11-10-82													HT9469	HT9491
NATE SAMPLED 11-4-82 10-21-82 11-11-82 10-21-82 11-11-82 10-19-82 11-4-82 10-19-82 11-4-82 10-19-82 11-10-82	BEV SAMPLE NO.									CBS-11-	CBS-12-	CBS-12-	CBS-13-	CBS-13
							GW-01	GW-02	CM-01	GW-02	GW-01	GW-02	GW-01	GW-02
Acid Compounds 2,4-dimethyl phenol nd		_						11-4-82		11-4-82	10-21-82	11-10-82	11-16-82	11-30-82
2,4-dimethylphenol nd	DETECTION LIMIT REFERENCE NO.	(4)	(4)	(4)	(6)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
Base/Neutral Compounds Same/Neutral Compou	Acid Compounds				•			(ug/l)						
Base/Neutral Compounds Same/Neutral Compou	2.4~dimethylphenol	nd	nd	0 R#	nd	nd	ad	-4	4	-4	-4	_4	4	
Base/Neutral Compounds Same/Neutral Compou	• •													
acenaphthene and acenaphthene acenaphthene and acenaphthene acenaphthene and acenaphthene and acenaphthene acenaphthene and acenaphthene and acenaphthene acenaphthene and acenaphthene acenaphthene and acenaphthene and acenaphthene and acenaphthene acenaphthene and acenaphthene and acenaphthene and acenaphthene acenaphthene and acenaphthene acenaphthene and acenaphthene and acenaphthene and acenaphthene acenaphthene and	Pennetatopacaet			60	ш	uu	na	nu	no	na	3.0*	Ba	na	Nd
fluorenthane	Base/Neutral Compounds													
fluorenthane	acenaphthene	nd	nd	6.5*	nd	nd	nd	nd	nd	ad	nd	nd	m.d	
naphthalene nd 25 28 nd nd nd nd nd nd nd n	•													
bis (2-ethylhexyl) phthalate 2.1* 3.3* 1.4* nd nd nd nd nd nd nd nd 1.5* nd 1.5* nd nd 2.4* 1.3* 1.2* 1.7* di-n-butyl phthalate nd	naphthalene													
di-n-butyl phthalate														
fluorene nd nd 6.2* nd	di-n-butyl phthalate				-							_		
phenanthrene								-						
Pyrene nd 1.4* nd nd nd nd nd nd nd n					-							*		
Volatiles benzeue nd	•						*							• • •
benzene nd	Pytane	110	***	110	NG.	no	no .	no	nu	na	ng	na	na	NG
1,1,1-trichloroethane nd	<u>Volatiles</u>													
1,1,1-trichloroethane nd nd <t< td=""><td>benzene</td><td>nd</td><td>nd</td><td>nd</td><td>nd</td><td>nd</td><td>nd</td><td>1.0*</td><td>nd</td><td>nd</td><td>nd</td><td>nd</td><td>nd</td><td>nd</td></t<>	benzene	nd	nd	nd	nd	nd	nd	1.0*	nd	nd	nd	nd	nd	nd
ethylbenzene nd 2.1* nd	1,1,1-trichloroethane		nd							-				
methylene chloride 6.0* 8.3* 6.9* 9.3* 7.0* 4.7* 5.9* 4.9* 5.7* 8.9* 7.2* 6.4* 6.6* trichlorofluoromethane nd	ethylbenzene	nd	2.1*	nd										
trichlorofluoromethane nd nd nd nd nd nd 4.0* ud nd nd nd nd nd nd tetrachloroethylene nd	methylene chloride	6.0*	8.3*	6.9*			_						• • •	•
tetrachloroethylene nd nd nd nd nd nd nd nd nd 3.5* 3.0* nd nd toluene nd 3.5* and nd nd nd nd nd nd nd nd nd	•	-												
toluene nd 3.5* nd nd nd nd nd nd nd nd nd														-
							-							
	trichloroethylene	nd	nd	ad	nd	3.3*	nd	nd	nd	nd	nd	nd	nd	1.4*

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TABLE A-3 SOUTH TACOMA SWAMP PRELIMINARY SITE INVESTIGATION GROUND-WATER ANALYSES (Continued)

BLACK & VEATCH KANSAS CITY, HO Page 4 of 5

SHO TRAFFIC NOS.	T1397/ HT9485	T1368/ HT9464	T1398/ HT9486	T1369/ HT9465	T1399/ HT9487	T1370/ HT9466	T1400/ HT9488	T1371/ HT9467	T1401/ HT9489	T1372/ NT9468	T1402/ HT9490	T1373/ HT9469	T1403/ HT9491
B&V SAMPLE NO.	CBS-07-	CBS-08-	CBS-08-	CBS-09-	CBS-09-	CBS-10-	CBS-10-	CBS-11-	CBS-11-	CBS-12-	CBS-12-	CBS-13-	CBS-13
	GW-02	GW-01	GW-02	GW-01	GW-02	GW-01	CW-02	GW-01	GW-02	GM-01	GW-02	GW-01	GW-02
DATE SAMPLED	11-4-82	10-21-82	11-11-82	10-21-82	11-11-82	10-19-82	11-4-82	10-19-82	11-4-82	10-21-82	11-10-82	11-16-82	11-30-82
DETECTION LIMIT REFERENCE NO.	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)	(11)
Inorganica							(ug/1)						
Boron (B)	620	1200	1600	130	1000	nd	640	nd	1080	nd	430	810	600
Barium (Ba)	nd	nd	490	nd	200	nd							
Copper (Cu)	nd	46	nd	nd	nd	nd							
Iron (Fe)	nd	13600	17500	15000	17500	nd	nd	nd	40	nd	44	nd	nd
Manganese (Mn)	nđ	1400	1300	1100	1200	nd	nd	nd	16	nđ	13	nd	nd
Zinc (Zn)	380	20	100	45	160	nd	350	nd '	300	32	100	59	nd
Armenic (Am)	nd	18	nd	nd	กน์	nd							
Cadmium (Cd)	bn	ad	nd	1.6	nd								
Hercury (Hg)	0.73	ba	nd	ba	nd	nd	nd	nd	0.94	nd	nd	nd	1.2
Cyanide (CN)	nd	17	nd	17	ba	nd	nd						
Other Pollutants													
Ammonia	nd	930	530	1030	620	ad	nd (mg/l)	nd	bn	140	nd	nd	bn
Chlorides	7.0	30	35	4.0	3.0	10	12	6.0	nd	4.0	1.0	200	160
Nitrate-N	2.8	2.2	0.4	19	0.32	0.05	5.3	0.04	2.0	0.64	2.8	0.12	nd
•												<u>-</u>	

*-Below quantitation limit nd-Not detected

1-Detected in laboratory blanks All other priority pollutants not detected

TABLE A-3
SOUTH TACOMA SWAMP
PRELIMINARY SITE INVESTIGATION
GROUND-WATER ANALYSES

BLACK & VEATCH KANSAS CITY, HO Page 5 of 5

SHO TRAFFIC HOS. BEV SAMPLE NO.	T1341/ MT9495 CBS-49- GV-01
DATE SAMPLED DETECTION LIMIT REFERENCE NO.	12-2-82
Base/Neutral Compounds	(ug/l)
bis (2-ethylhexyl) phthalate 1	1.2*
Volatiles	
methylene chloride 1 trichloroethylene	12 1.9*
DETECTION LIMIT REFERENCE NO.	(11)
Inorganica	
Boron (B)	830
Iron (Fe)	110
Hanganese (Hn)	180
Zinc (Zn)	140

Other Pollutants

Ammonia	250
	(mg/1)
Chlorides	11
Nitrate-N	nd

^{*-}Below quantitation limit 1-Detected in laboratory blank All other priority pollutants not detected nd - not detected

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TABLE A-4 SOUTH TACOMA SWAMP PRELIMINARY SITE INVESTIGATION SURFACE SOIL ANALYSES

BLACK & VEATCH KANSAS CITY, HO Page 1 of 5

	SMO TRAFFIC NO.	T1322/ HT8911	T1323/ HT8912	T1324/ MT8913	T1325/ HT8914	T1326/ HT8915	T1327/ HT8916	T1328/ HT8917	T1329/ HT8918	T1330/ HT8919	T1331/ HT8921	T1332/ HT8922	T1333/ HT8923
	BEV SAMPLE NO.	CBS-26- SL-01	CBS-27- SL-01	CBS-28- SL-01	CBS-29- SL-01	CBS-30- SL-01	CBS-31- SL-01	CBS-32- SL-01	CBS-33- SL-01	CBS-34- SL-01	CBS-35- SL-01	CBS-36- SL-01	CBS-37- SL-01
	DATE SAMPLED	10-18-82	10-18-82	10-82-82	10-18-82	10-18-82	10-18-82	10-18-82	10-18-82	10-18-82	10-18-82	10-18-82	10-18-82
	DETECTION LINIT REFERENCE NO.	(3)	(2)	(2)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
	DETECTION LINES REFERENCE NO.	(3)	(4)	(2)	(.,	(.,	(-/	\. ,	(-,	\- 7	(-)	(-)	\ -,
	Acid Compounds							(ug/Kg)					
	phenol	nd	nd	nd	nd	bn	400K	nd	nd	nd	bn	nd	nd
	(Non-priority pollutants)												
	benzoic acid	100000K	nd	nd	nd	11000	nd	nd	nd	nd	nd	nđ	nd
	Base/Neutral Compounds								•				
	fluoranthene	pd	nd	nd	nd	nd	ba	nd	nd	2700	880	560	880
	naphthalene	nd	nd	nd	7600	nd							
	bis (2-ethylhexyl) phthalate	29000	កថ	nd									
	di-n-butyl phthelate	nd	nd	nd	กป	520	nd						
_	. benzo(a) anthracene	nd	nd	nd	nd	ba	nd	nd	nd	1300	520	640	960
_	benzo(a) pyrene	nd	nd	ba	nd	nd	nd	nd	ad	1100	800K	2000	1800
	3,4-benzofluoranthene	nd	nd	ով	nd	nd	nd	nd	nd	1200	800	2100	1500
_	benzo(k)fluoranthene	nd	กป	nd	ba	nd	nd	nd	nd	1200	800K	1000	1500
	chrysene	10000K	nd	3000	560	1000	1200						
	benzo(ghi)perylene	nd	800K	nd	1300	1600							
	phenanthrene	10000K	nd	1300	800	400K	400K						
_	dibenzo(a,b)anthracene	ad	nd	1000	nd								
_	. indeno(1,2,3-cd)pyrene	nd	nd	ba	nd	nd	nd	nd	nd	800K	nd	1100	1800
	pyrene	nd	nd	nd	ba	nd	nd	nd	ba	2900	1100	880	1100
	(Non-priority pollutants)	•								3.5		7	
	2-methylmapthalene	nd	bn	nd .	800K	nd	ba	ad	nd	nd	nd	nd	nd

TABLE A-4 SOUTH TACOMA SWAMP PRELIMINARY SITE INVESTIGATION SURFACE SOIL ANALYSES (Continued)

BLACK & VEATCH KANSAS CITY, HO Page 2 of 5

SHO TRAFFIC NO.	T1322/ HT8911	T1323/ HT8912	T1324/ HT8913	T1325/ HT8914	T1326/ HT8915	T1327/ MT8916	T1328/ HT8917	T1329/ HT8918	T1330/ HT8919	T1331/ HT8921	T1332/ HT8922	T1333/ HT8923
BGV SAMPLE NO.	CBS-26- SL-01	CBS-27- SL-01	CBS-28- SL-01	CBS-29- SL-01	CBS-30- SL-01	CBS-31- SL-01	CBS-32- SL-01	CBS-33- SL-01	CBS-34- SL-01	CRS-35- SL-01	CBS-36- S101	CBS-37- SL-01
DATE SAMPLED DETECTION LIMIT REFERENCE NO.	10-18-82 (3)	10-18-82 (2)	10-82-82 (2)	10-18-82 (1)	10-18-82 (1)	10-18-82 (1)	10-18-82 (1)	10-18-82 (1)	10-18-82	10-18-82 (1)	10-18-82 (1)	10-18-82
Volatiles												
1,2-dichloroethane,	nd	1.4*	nd	nd	nd	nd						
methylene chloride	25	4.8	23	2.0	5.0	6.5	7.0	2.0*	nd	8.0	53	19
trichlorofluoromethane	10	3.3	5.6	2.1	2.5	2.5K	nd	2.0*	nd	4.0	4.0	nd
(Non-priority pollutants)								•				
acetone	nd,	nd	ba	nd	33							
Pesticides												
PCB-1248	57900	nd ,	nd	nd	nd	nd	bn	nd	nđ	nd	nd	nd
PCB-1254	nd	14442	nd	nd	nd	nd	nd	nd	0.54	nd	nd	nd
DETECTION LIMIT REFERENCE NO.	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
Inorganics							(mg/Kg)					
Aluminum (Al)	1100	1900	1000	3500	2200	2300	540	360	1200	3400	1200	510
Boron (B)	nd	22	nd 48									
Barium (Ba)	34	22	ad	18	nd	23	17	nd	46	18	62 54	46 2.8
Chromium (Cr)	2.8	nd	nd	nd	nd	nd	nd	nd 1	nd 330	nd 52	21	nd
Copper (Cu)	31	nd	nd	6.9	6.8	nd	nd COO	nd 410	1040	280 0	3000	920
Iron (Fe)	470	680	250	440	310	260 32	690 25	21	430	1800	230	46
Hanganese (Hu)	35	60	41	83	10	nd	ad ad	nd	35	5.7	15	nd
Nickel (Ni)	nd	nd	nd 10	nd 47	nd 6.8	na 2.1	5.8	2.7	120	15	21	3.8
Zinc (Zn)	91	10	19	47	0.0	2.1	J. 0					

Footnotes on page 3 of 5

TABLE A-4 SOUTH TACOMA SWAMP PRELIMINARY SITE INVESTIGATION SURFACE SOIL ANALYSES (Continued)

BLACK & VEATCH KANSAS CITY, HO Page 3 of 5

SHO TRAFFIC NO.	T1322/	T1323/	T1324/	T1325/	T1326/	T1327/	T1328/	T1329/	T1330/	T1331/	T1332/	T1333/
	MT8911	HT8912	HT8913	HT8914	HT8915	HT8916	HT8917	HT8918	MT8919	HT8921	HT8922	HT8923
B&V SAMPLE NO.	CBS-26-	CBS-27-	CBS-28-	CBS-29-	CBS-30-	CBS-31-	CBS-32-	€BS-33-	CBS-34-	CBS-35-	CBS-36-	CBS-37-
	SL-01	SL-01	SL-01	SL-01	SI01	SL-01	SL-01	SL-01	SL-01	SL-01	SL-O1	SL-01
DATE SAMPLED	10-18-82	10-18-82	10-82-82	10-18-82	10-18-82	10-18-82	10-18-82	10-18-82	10-18-82	10-18-82	10-18-82	10-18-82
DETECTION LIHIT REFERENCE NO.	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
Inorganics												
Arsenic (As)	4.6	2.2	1.3	5.4	4.3	1.4	nd	nd	110	6.0	2.0	nd
Cadmium (Cd)	0.2	0.2	0.3	0.2	0.4	0.5	nd	0.7	0.2	0.4	nd	3.4
Lead (Pb)	72	6.5	8.8	14	86	12	2.8	1.4	200	31	35	17
Antimony (Sb)	nd	រាជ	ba	nd	nd	nd	nd	nd	13	3.6	nd	nd
Tin (Sn)	nd	nd	ba	nd	nd	ba	nd	nd	nd	nd	nd	nd

^{*-}Below quantitation limit

K-Detected below but more than one half of specified detection limit All other priority pollutants not detected

¹⁻Detected in laboratory blank 2-PCB cannot be confirmed by GC/MS

TABLE A-4 SOUTH TACOMA SWAHP PRELIMINARY SITE INVESTIGATION SURFACE SOIL ANALYSES (Continued)

T1321/ T1334/ T1335/ T1336/ T1337/ T1320/ SHO TRAFFIC NO. HT8926 HT8927 HT9424 HT9425 HT8924 HT8925 CBS-38-CBS-39-CBS-40-CBS-41-CRS-47-CBS-48-B&V SAMPLE NO. SL-01 SL-01 SL-01 SL-01 SL-01 SL-01 DATE SAMPLED 10-18-82 10-18-82 10-82-82 10-18-82 10-18-82 10-18-82 DETECTION LIMIT REFERENCE NO. (1) (1) (1) (1) (1) (1) (ug/Kg) Acid Compounds 3600 1900 ьn nd phenol рď Вa Base/Neutral Compounds 400K nd ba nd nd nd acenaphthene 400K 400K fluoranthene 1000 nd nđ nd 400K naphthalene nd nd nd nd Βđ benzo(a)anthracene 1600 nd nd nd nd nd 1800 nđ nd nd nd benzo(a)pyrene nd 3,4-benzobluoranthene 1600 ba nd nd вđ nd benzo(k)fluoranthene nd nd nd ba 1600 nd 1500 ba 400K nd nd chrysene nd benzo(ghi)perylene 1200 nd nd nd nd nđ 400K 400K phenanthrene 400 nd nd nd nd - dibenzo(a,h)anthracene 1300 nd nd nd nd - indeno(1,2,3-cd)pyrene 2100 nd nd nd nd nd 400K 400K 400K 1400 nd nd pyrene (ug/Kg) Volatiles methylene chloride 15 14 14 3.6 3.7 27 4.3 2.7 trichlorofluormethane 14 nd nd nd nd 32 nd Вa ba trichloroethylene nd

Footnotes on page 5 of 5

BLACK & VEATCH KANSAS CITY, HO Page 4 of 5

TABLE A-4 SOUTH TACONA SWAMP PRELIMINARY SITE INVESTIGATION SURFACE SOIL ANALYSES (Continued)

T1320/ T1321/ T1336/ T1337/ SHO TRAFFIC NO. T1334/ T1335/ HT8925 HT8926 HT8927 HT9424 HT9425 HT8924 CBS-47-CBS-48-BAY SAMPLE NO. CBS-38-CBS-39-CBS-40-CBS-41-SL-01 SL-01 SL-01 SL-01 SL-01 SL-01 10-18-82 10-18-82 10-82-82 10-18-82 10-18-82 10-18-82 DATE SAMPLED (1) (1) (1) DETECTION LIMIT REFERENCE NO. (1) (1) (1) (mg/Kg) Inorganics 1000 3900 1600 1600 670 1700 Aluminum (Al) 56 140 68 71 ađ 56 Berium (Ba) 20 1.1 24 Вa ba nd Chromium (Cr) 28 nd 20 2800 51 29 Copper (Cu) 2500 6200 3600 Iron (Fe) 4900 230 5800 1030 210 7.5 720 410 Manganese (Mn) 230 nd 46 Nickel (Nk) 20 nd nd 69 1800 19 9.1 7.5 Zinc (Zn) 41 11 8.0 6.7 nd 1.6 2.9 2.3 Arsenic (As) 0.4 nd 0.5 0.2 1.7 Cadmium (Cd) 0.4 4.1 54 4300 23 16 Lead (Pb) 65 nd bа nd 4.7 nd nd Tin (Sn)

nd-Not detected K-Detected below but greater than one hald of specified detection limit l-Detected in laboratory blanks All other priority pollutants not detected BLACK & VEATCH KANSAS CITY, HO Page 5 of 5

TABLE A-5 SOUTH TACOMA SWAMP PRELIMINARY SITE INVESTIGATION SUBSURFACE SOIL ANALYSES

BLACK & VEATCH KANSAS CITY, HO Page 1 of 4

SMO TRAFFIC NOS.	T1294/ HT8998	T1295/ HT8999	T1296/ HT9000	T1297/ HT9401	T1298/	T1299/	T1300/	T1301/	T1302/	T1303/	T1304/	T1305/	T1306/
BEV SAMPLE NO.	CBS-01-	CBS-01-	CBS-02-	CBS-02-	MT9402 CBS-03-	HT9403 CBS-03-	HT9404 CBS-04-	MT9405 CBS-04-	NT9406 CBS-05-	MT9407 CBS-05-	MT9408 CBS-06-	HT9409 CBS-06-	HT9410 CBS-07-
ELEVATION (FEET)**	SS-01 216	SS-02 211	SS-01 227	SS-02 212	SS-01 221	SS-02 211	SS-01 233	SS-02 213	SS-01 224	SS-02 214	SS-01 220	SS-02 210	5S-01 236
DATE SAMPLED	10-11-82	10-11-82	10-13-82	10-13-82	10-9-82	10-9-82	10-11-82	10-11-82	10-11-82	10-11-82	10-12-82	10-12-82	10-12-82
DETECTION LIMIT REFERENCE NO.	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Base/Neutral Compounds							(ug/Kg)						
di-n-butyi phthalate	nd	nd	nd	nd	nd	nd .	nd	nd	400K	nd	nd	nd	nd
Volatiles													
methylene chloride 1 .	24	10	5.0	31	9.4	11	6.2	32	24	20	74	22	
trichlorofluoromethane	nd	nd	nd	nd	nd·	nd	nd	od .	nd	29 2.5K	74 nd	22 nd	8.7 nd
					114		144	14 .	110	2.38	110	IIO	ai u
(Non-Priority pollutants)					•								
acetone ²	26*	ba	ba	nđ	nd	nd	nd	2.7*	nd	nd	nd	nd	nd
DETECTION LIMIT REFERENCE NO.	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(.12)	(12)	(12)
Inorganica							(mg/Kg)						
Aluminum (Al)	940	950	1000	580	990	80	780	820	1100	720	1400	480	830
Barium (B)	nd	nd	nd	nd	nd	nd ha	nd						
Chromium (Cr)	nd	1.8	nd	nd	1.2	nd	1.3	2.2	2.2	1.5	1.2	nd	nd
Copper (Cu)	nd	nd	рď	ba	7.2	nd	nđ						
Iron (Fe)	790	860	1370	480	990	760	460	830	1350	790	930	840	730
Hanganese (Mri)	59	64	30	18	89	46	33	41	191	108	23	13	78
Nickel (Ni)	nd	nd	ьd	nd	nd	nd	nd	4.6	nd	nd	5.1	4.1	4.9

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TABLE A-5 SOUTH TACOHA SWAMP PRELIMINARY SITE INVESTIGATION SUBSURFACE SOIL ANALYSES (Continued)

BLACK & VEATCII KANSAS CITY, NO Page 2 of 4

SHO TRAFFIC NOS.	T1294/	T1295/	T1296/	T1297/ .	T1298/	T1299/	T1300/	T1301/	T1302/	T1303/	T1304/	T1305/	T1306/
·	MT8998	HT8999	HT9000	HT9401	HT9402	HT9403	HT9404	HT9405	HT9406	HT9407	HT9408	HT9409	MT9410
B&V SAMPLE NO.	CBS-01-	CBS-01-	CBS-02-	CBS-02-	CBS-03-	CBS-03-	CBS-04-	CBS-04-	CBS-05-	CBS-05-	CBS-06-	CBS-06-	CBS-07-
	SS-01	SS-02	SS-01	SS-02	SS-01	SS-02	SS-01	SS-02	SS-01	SS-02	SS-01	SS-02	SS-01
ELEVATION (FEET)**	216	211	227	212	221	211	233	213	224	214	220	210	236
DATE SAMPLED	10-11-82	10-11-82	10-13-82	10-13-82	10-9-82	10-9-82	10-11-82	10-11-82	10-11-82	10-11-82	10-12-82	10-12-82	10-12-82
DETECTION LIMIT REFERENCE NO.	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Vanadium (V)	nd	nd	nd	nđ	nd	nd	nd .	nd	nd	nd	ha	nd	nd
Ziuc (Zn)	4.2	4.9	5.7	2.9	6.2	5.1	1.9	5.0	6.2	5.1	6.1	4.2	4.8
Arsenic (As)	nd	nd	nd	nd	nd	nd	nd	nd	1.4	nd	2.2	nd	nd
Cadmium (Cd)	ad	nd	nd	nd	nd	nd .	0.2	0.2	nđ	nd	nd	nd	nd
Lead (Pb)	1.5	. 1.2	1.5	0.6	2.3	3.6	1.0	1.3	2.3	1.1	5.0	1.0	1.3

TABLE A-5 SOUTH TACOMA SWAMP · PRELIMINARY SITE INVESTIGATION SUBSURFACE SOIL ANALYSES

BLACK & VEATCH KANSAS CITY, HO Page 3 of 4

SHO TRAFFIC NOS.	T1307/	T1308/	T1309/	T1310/	T1311/	T1312/	T1313/ NT9417	T1314/ HT9418	T1315/ HT9419	T1316/ HT9420	T1317/ HT9421	T1318/ HT9422	T1319/
BEV SAMPLE NO.	HT9411 CBS-07- SS-02	HT9412 CBS-08- SS-01	MT9413 CBS-08- SS-02	HT9414 CBS-09- SS-01	HT9415 CBS-09- SS-02	HT9416 CBS-10- SS-01	C8S-10- SS-02	CBS-11- SS-01	CBS-11- SS-02	CBS-12- SS-01	CBS-12- SS-02	CBS-13 SS-01	CBS-13- SS-02
ELEVATION (FEET)*	207	211	206	214	209	232	217	236	216	225	210	185	155
DATE SAMPLED DETECTION LIMIT REFERENCE NO.	10-12-82 (1)	10-13-82	10-13-82 (1)	10-11-82 (1)	10-11-82	10-11-82 (1)	10-11-82 (1)	10-14-82 (1)	10-14-82 (1)	10-13-82 (1)	10-13-82 (1)	11-16-82 (1)	11-16-82 (1)
	(.,	(.,	(.,	(.,	(.,		(-7	(-)	(-,	\- /	,	(-,	(-,
<u>Volatiles</u>						(ug/Kg)							
methylene chloride	7.7	na 2	110	62	28	34	44	9.9	31	8.1	62	3.8	6.7
trichlorofluoromethane	nd	na ^Z	ba	3.6	6.0	4.6	4.2	4.7	2.7	6.0	nd	ad	nd
Pesticides													
beta-endosulfan	nd	nd	nd	nd	ba	nd	nd	6.8 ³ .	nd	nd	nd	nd	nd
DETECTION LIMIT REFERENCE NO.	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)	(12)
Inorganics						(mg/Kg)							
Aluminum (Al)	570	1300	520	620	490	850	590	550	580	610	620	1168	1321
Barium (Ba)	nd	45	nd	nd	nd	nd	nd	nd	nd	nđ	nd	11	11
Chromium (Cr)	nd	4.4	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.4 5.4	2.3
Copper	.nd	nd	nd	nd	nd	nd	ad	nd 220	nd (20	กป 580	nd 520	3.4 1944	nd 1831
Iron (Fe)	620	2900	1300	1460	1310	720	560	330 36	420 23	20	530 36	28	38
Hanganese (Hn)	31	42	25	21	17	63	33			nd	nd	nd	9.3
Nickel (Ni)	nd '	6.4	6.3	5.6	4.2	nd	nd	nd	nd	na nd	nd nd	na 5.0	4.2
Vanadium (V)	nd	nd	nd	nd	nd	nd	nd	nd	nd	na 6.2	na 2.9	5.4	7.6
Zinc (Zn)	3.9	4.0	12	5.3	5.2	4.8	3.9	5.7	2.9		1.1	1.1	1.1
Arsenic (As)	nd	6	1.5	nd	nd	nd	1.2	1.5	1.3 nd	1.3 nd	nd	0.2	0.6
Cadmium (Cd)	nd	0.2	nd	nd	nd	nd	nd	nd 2.4				0.2	0.0
Lead (Pb)	0.8	15.9	7.3	1.4	6.1	2.0	2.1	2.8	2.2	3.9	1.3 nd	nd	nd
Tin (Sn)	ba	nd	bd	nd	nd	nd	nd	nd	nd	2.8	na	ng	RU

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TABLE A-5 SOUTH TACOMA SWAMP PRELIMINARY SITE INVESTIGATION SUBSURFACE SOIL ANALYSES

BLACK & VEATCH KANSAS CITY, HO Page 4 of 4

Calcium Magnesium Sodium	na na	na na , na	na na na	na na na	na na na	ne na . na	na na	na na na	na na na	na na na	na na na	1072 433 141	1234 900 nd
Other Pollutants							(mg/Kg)						
ELEVATION (FEET)* DATE SAMPLED DETECTION LIMIT REFERENCE NO.	SS-02 207 10-12-82 (1)	SS-01 211 10-13-82 (1)	SS-02 206 10-13-82 (1)	SS-01 214 10-11-82 (1)	SS-02 209 10-11-82 (1)	SS-01 232 10-11-82 (1)	SS-02 217 10-11-82 (1)	236 10-14-82 (1)	216 10-14-82 (1)	225 10-13-82 (1)	210 10-13-82 (1)	185	155
SHO TRAFFIC NOS. BEV SAMPLE NO.	T1307/ HT9411 CBS-07-	T1308/ HT9412 CBS-08-	T1309/ HT9413 CBS-08-	T1310/ MT9414 CBS-09-	T1311/ HT9415 CBS-09-	T1312/ HT9416 CBS-10-	T1313/ HT9417 CBS-10-	T1314/ MT9418 CBS-11- SS-01	T1315/ HT9419 CBS-11- SS-02	T1316/ HT9420 CBS-12- SS-01	T1317/ HT9421 CBS-12- SS-02	T1318/ HT9422 CBS-13 SS-01	T1319/ HT9423 CBS-13- SS-02

ns-Not Analyzed
All other priority pollutants not detected
#USGS Datum

nd-Not detected
1-Detected in laboratory blank
2-No volatile analyses included due to laboratory accident
3-Pesticide cannot be confirmed by GC/MS

TABLE A-6 SOUTH TACOMA SWAMP PRELIMINARY SITE INVESTIGATION FIELD BLANK ANALYSES

BLACK & VEATCH KANSAS CITY, HO Page 1 of 1

SHO TRAFFIC NOS. BEV SAMPLE NO. DATE SAMPLED DETECTION LIMIT REFERENCE NO. Based Manufacture Community	T1388/ HT9441 CBS-44- GW-01 10-25-82 (4)	T1389/ HT9440 CBS-45- GW-01 10-25-82 (4) (ug/1)	T1390/ HT9442 CBS-46- GW-01 11-9-82 (4)
1,2-diphenylhydrazine (as azobenzene)	70	130	570
<u>Yolstiles</u>			
1,1,1-tricholoromethane chloroform methylene chloride	nd 7.8* 5.4*	1.1* 10 5.1*	2.4* 20 7.6*
(Non-priority pollutants)	•		
acetone	ba	nd	37
DETECTION LIMIT REFERENCE NO.	(11)	(11)	(11)
Inorganics			
Boron (B) Zinc (Zn)	700 21	600 20	450 240
Other Pollutants		mg/l	
Chlorides Nitrate-N	1.5 0.46	nd 0.53	nd 0.55

nd-Not detected *-Below quantitation limit All other priority pollutants not detected

APPENDIX B

LOGS OF BORINGS

SOUTH TACOMA SWAMP

PRELIMINARY SITE INVESTIGATION

BORING LOG LEGEND AND NOMENCLATURE Figures B-1 through B-27

Items shown on boring logs refer to the following:

- 1. <u>Depth</u> Depth below reference elevation, ground surface unless otherwise shown
- 2. Sample Types designated by letter
 - D Disturbed sample, obtained from auger cuttings or wash water for classification purposes only
 - S Split-spoon sample, obtained by driving 2-inch split-spoon to determine penetration resistance and allow classification
 - C Liner tube sample, obtained by penetration of thick, wall sampler containing 2-inch-diameter liner tubes (California sampler)
 - U Undisturbed sample, obtained by penetration of minimum 3-inch-diameter, thin-wall tube using an open or, where indicated, fixed-piston sampling head
 - DM Dames and Moore Sampler
 - Rec Recovery is expressed as a ratio of the length recovered to the total length pushed or driven (in inches), i.e., 8
 - Resist Resistance is designated as follows:
 - P Sample pushed in one continuous movement by hydraulic rig action, maximum hydraulic pressure shown where pertinent
 - 3 6 $_{9}$ Numbers indicate blows per 6 inches of sampler penetration
- Description Description of material according to the Unified Soil Classification: word description gives soil constituents, consistency or density, and other appropriate classification characteristics. Unified Soil Classification symbols are shown on the USC column. Geologic names, where appropriate, are shown under Special Notes. A solid line indicates stratigraphic change; a dashed line indicates approximate location of stratigraphic change.
- 4. Special Notes and Field Observations Pertinent observations made by inspector during drilling including type of boring, free water level, water seepage, fluid loss, hole termination depth, etc.
- 5. Legend
 CFA Continuous flight auger
 ATD At time of drilling
 AD After drilling
 DWL Drill water loss
 DWR Drill water return

 Water depth at specified time after drilling
 Water entry depth at time of drilling

Γ		 			Unified Soil Classi	ication System		
	MAJOR DIVISIONS			GROUP SYMBOLS	I YPICAL NAMES	CLASSIFICATION CRITERIA		
		S COLUS E Ed 6) sieve	CLEAN GRAVELS	GW	Well graded gravels and gravel-sand minitures, little or no fines	C _u D ₆₀ 'D ₁₀ Greater than 4 (D ₃₀) ² C _s D ₁₀ = D ₆₀ Between 1 and 3		
	nim (No. 200) sieve	GRAVELS 50% or more of course fraction retained on 4.75 nm (No. 4) seve		GP	Poorly graded gravels and gravel-sand mixtures, little or no fines	One of the stand o		
CHES	ini (No.	GK Or n fraction	GRAVELS WITH FINES	GM	Silty gravels, gravel sand silt mixtures	8 8 9 or plasticity index less than 4 in hatched area are		
GRAINI D SOILS	More than 50% retained on 0 075 m	. S		GC	Clayey gravels, gravel-sand- clay mixtures	Atterberg limits plot above "A" line requiring use of dual symbols		
COARSE GRAI		6 of n Vo. 4) sieve	CLEAN	SW	Well-graded sands and gravelly sands, little or no fines	or plasticity index less than 4 borderline classification of the state		
1 8	ian 50%	SANDŞ Mure ihan 50% of coarse fraction passet 4.75 mm (No.		ъ	Poorly graded sands and gravelly sands, little or no fines	Not meeting both criteria for SW		
	More th	More t coars	SANDS WITH FINES	SM	Silty sands, sand-silt mixtures	Atterberg limits plot below "A" line Atterberg limits plots or plasticity index less than 4		
		ã	SA	sc	Clayey sands, sand-clay mixtur	Atterberg limits plot above "A" line borderline classification and plasticity index greater than 7 symbols		
	or more passing 0.075 mm (No. 200) sieve*	SAI	50% or less	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	60 PLASTICITY CHART		
01.6		SILTS AND CLAYS Liquid limit 60% or less		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	× 50 For classification of time yeared using self-time fractions of times to greate the fractions of times to greate the fractions After samp § London performs benefiting And of the contraction of the self-times C H		
FINE GRAINED SOILS		פור <u>נ</u>		OL	Organic silts and organic silty clays of low plasti- city	SO CL MH or OH		
FINE GR		LAYS 0%	0%	мн	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts			
	OF (TIO14	SILTS AND CLAYS Liquid limit Frethr than 50%	ł	СН	Inorganic clays of high plasticity, fat clays	0 10 20 30 40 50 60 70 80 90 10		
	80 X	SILTS		он	Organic clays of medium to high plesticity	LIQUID LIMIT		
	н	ighly Organic	Soils	PT	Peat, muck and other highly organic soils	Visual-Manual Identification, See ASTM Designation D 2488.		

BORING LOG

PROJEC	T NAM		COMM	ENCEMENT BAY		DEET 1 OF 2 OJECT NO. K81-4521			
			DA.	TE 10-11-82					
CBS-01 PROJECT LOCATION Tacoma, Washington LOGGED BY M. Genoud DRILLED BY R. Kring						Mobile B-61			
CHIDEAC	·F F: E	CVATION	WA	ATD ENTERS E1. 215					
DEPTH		REC	RESIST		ı s.c.	SPECIAL NOTES AND FIELD OBSERVATIONS			
_				Loose, dark brown, poorly graded, Gravelly SAND with trace of silt Loose, gray, poorly graded, coarse	SP GP	Boring advanced with 10" diameter hollow- stem augers with 11"			
-	DM	12 18	3 7 8	grained GRAVELLY SAND with trace of silt		diameter bit Sampler driven with 325 lbs. cable tool— jars			
5			Ů			Slightly moist OVA-0.3ppm			
				Medium dense, red-yellow, poorly graded,	SP	Moist			
				 fine to medium grained SAND with trace of silt 		- · · · · · · · · · · · · · · · · · · ·			
	· .		-	· · · · · · · · · · · · · · · · · · ·					
	DM	15 18	7 11 18	<u> </u>					
10						OVA-Background			
_						_			
-				-					
-	DM	15 18	20 26	Dense, gray, poorly graded, fine to medium grained SAND with some gravel and trace of silt		Moist to wet — OVA-0.2ppm —			
15-	,			_					
-				- -		_			
-		100	11	-		-			
	DM	18 18	16 23	_		OVA-0.1ppm			
20-									
-				-		-			
-				- -		_			
-	DM	18 18	10	- · ·		OVA-0.8ppm			
-		-	17	 Becoming gray-yellow and medium _ — grained 		Water detected _			
25-	1			WOODWARD-CLYDE CONSULTANTS		FIGURE NO. B-1			

BORING LOG

					200	SH	ET 2 OF 2
PROJEC	T NAM	Ε	PR	OJECT NO. K81-4521			
			DA	DATE 10-11-82			
CBS-01 PROJECT LOCATION Tacoma, Washington							Mobile B-61
				GGED 239	BY M. Genoud DRILLED BY R. Kring USC & GS		ATER ENTERS El. 215
SURFAC	E ELE	VATION		2))	ELEVATION DATUM USC 8 GS	_	AIV
DEPTH 25 -	S TYPE	AMPLE REC	RESIST		DESCRIPTION	u.s.c.	SPECIAL NOTES AND FIELD OBSERVATIONS
27]			•		SAME: Dense, gray-yellow, poorly graded,	\$P	Saturated
-				-	medium grained SAND with some gravel - and some silty clay		
				L	and some Silly Clay		_
-		18	6	t	-		OVA-5.4ppm
	DM	18 18	12	L	•		-
			20	1			Bottom of boring
30-							29.5'
-				-	-	}	-
				ļ			
-				Γ	-		_
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-	1				•	7	

WOODWARD-CLYDE CONSULTANTS

FIGURE NO. B-2

BORING LOG

PROJE	CT NAM	E	СОМ	MENCEMENT BAY		ROJECT NO. <u>K81-4521</u>
				DJECT LOCATIONTacoma, Washington	D/	10-13-82 Mobile B-61
	·	·	س س	GGED BY G. Hess DRILLED BY S. Sterling		ATER ENTERS El. 214
SURFA	CE ELE	VATION	2	40 ELEVATION DATUM USC & GS		ATD
DEPTH	TYPE	REC	RESIST	DESCRIPTION	usc	SPECIAL NOTES AND FIELD OBSERVATIONS
5	DM	10 12	7 16	Medium dense, dark brown, low plastic Clayey SILT to Silty CLAY with some fine to coarse gravel Medium dense, light brown-tan, fine grained, poorly graded, Silty SAND with some fine to medium gravel with trace of clay	CL ML SM	Boring advanced with 10" diameter hollow—stem augers with 11" diameter bit Sampler driven with 325 lbs. cable tool—jars OVA-0.2ppm
_						_
-		12	4	Medium dense, light brown, fine to medium grained, poorly graded SAND	SP	OVA-0.4ppm -
-	DM	12 12	15	- -	4	~ ~
10—				-	-	
-				-	-	-
-			;	-	-	_
-	DM	12	12	-	-	OVA-0.6ppm
-	J DA	12	12	-	-	-
15				 	-	_
-				-	4	-
-				_	-	-
-		12	8	· -	-	OVA-Background
-	DM	12	10		-	- Deckyloulid
20-					-	. –
-					_	-
-				-	4	-
-	 	15	13	· .	4	
-	DM	12	17	Becoming dense, medium grained and gray	_	OVA-0.8ppm
25						<u> </u>
				WOODWARD-CLYDE CONSULTANTS		FIGURE NO. B-3

						EET OF
PROJEC	CT NAM	<u> </u>	COM	ENCEMENT BAY		OJECT NO. <u>K81-4521</u> TE <u>10-13-82</u>
	CBS-	02	PR	JECT LOCATION Tacoma, Washington		Mobile B-61
L			س ب	GED BY G. Hess DRILLED BY S. Sterling		TER ENTERS E1. 214
SURFA	CE ELE	VATION	2	40 ELEVATION DATUM USC & GS		ATD
DEPTH	S	AMPLE		DESCRIPTION	LS.C.	SPECIAL NOTES AND
25 -	TYPE	REC	RESIST			FIELD OBSERVATIONS
_		ŀ			SP	- Water detected
		ļ ·		poorly graded SAND		ATD
-	1			7		
-		12	10		İ	0VA-4.2ppm
_	DM	12 12	10			
		1			1	
30 —	1					
-	1]			ŀ	-
1 _				_		
	. DM	12	5 15	1		OVA-0.6ppm
-				-		Bottom of boring
-	1					33.0'
35—	Į					
			•	_		
-	1			7		-
-	-		}			_
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		1				
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-	1					
_		<u> </u>	<u> </u>			
<u> </u>	1			WOODWARD-CLYDE CONSULTANTS		FIGURE NO. B-4

						EET OF
PROJE	CT NAM	4E	COMP	NCEMENT BAY	•	ROJECT NO. K81-4521
}	CBS-	.03		JECT LOCATIONTacoma, Washington		TE 10-9-82
L			_] [SED BY G. Hess DRILLED BY S. Sterling		G Mobile 8-61 ATER ENTERS El. 212
SURFA	CE ELI	EVATION	1	49 ELEVATION DATUM USC & GS		ATD
DEPTH		REC	RESIST	DESCRIPTION	usc	SPECIAL NOTES AND FIELD OBSERVATIONS
0 -				Firm, light brown, low plastic Silty	CL	Boring advanced with
-	ł]	CLAY with some gravel and trace of sand	CL	10" diameter hollow-
1			1			stem augers with 11"
-	1 .			₫		diameter bit -
-	<u> </u>	0	1,-			Sampler driven with 325 lbs. cable tool
	DM	10	17	Medium dense, light brown, fine to medium grained, poorly graded GRAVEL	GP	jars
-				with sand and silt		_
5-				_		
		l				
-		}		4		-
-]	ļ	•			_
i		}				
-	DM	0	6	4		-
-		<u>0</u> 12	12			_
	1					
10-	1	}				
_]					
				Dense, light brown-gray, medium to	SP	_
-	1			coarse grained, poorly graded SAND with 🚽		
-				some fine to medium gravel		OVA-Background -
	DM	18 18	12 18			OVA-background -
-	1 "	18	18	·		-
15-						
'		•]			
-	1	ł		٠		-
_	Į	1				
	}			7		_
-		2	10	4		-
_	DM	2 12	18	_		
		1		1		OVA-0.2ppm
20-						
_]			Dense, light brown, medium grained, poorly graded SAND		
-		}	ļ	Poority didner study		-
-	1			4		-
_						
	DM	18 18	10 18	7		-
-	חע	18	22	4		OVA-0.4ppm _
25-						
<u> </u>	l			WOODWARD-CLYDE CONSULTANTS		FIGURE NO 8-5

		-	COM	MENU	PRINT BAV		HEET 2 OF 2
PROJE	CT NAM	E	LUM	MENL	EMENT BAY		ROJECT NO. <u>K81-4521</u> ATE <u>10-4-82</u>
-	CBS-	.03			T LOCATIONTacoma, Washington	R	Mobile B-61
L			_ ₀	GGED	BY G. Hess DRILLED BY S. Sterling	_	ATER ENTERS E1. 212
SURFA	CE ELE	OITAV:	٧	249	ELEVATION DATUM USC & GS		ATD
DEPTH		REC	RESIST		DESCRIPTION	u.s.c	SPECIAL NOTES AND FIELD OBSERVATIONS
	ļ				Medium dense, light brown, medium to	SP	
-]			Γ.	fine grained, poorly graded SAND	7	
-		Ì		-		-	-
-	 	 	 	1		4	
	DM	12 12	7			İ	OVA-0.5ppm
				T	·	7	
30-				一	-	\dashv	
-				-		4]
				L	•		
	.					7	
-	DM	12	7 8	†		7	OVA-0.3ppm
-		12	8	-		4	
35							_
-				卜		7	<u> </u>
-				-		4	Water detected_ATD
_							_
	DM	12	8				0VA-0.3ppm
			1			7	-
40	}			-	-	\dashv	
-		İ		 -		4	_
		1		L	Becoming dense		_
1						7	_
-	DM	10 12	12	-	·	4	OVA-Background
-	Un	12	20	-		4	
45					_		Bottom of boring 44.0'
							77.0
				-		4	-
4				-		4	-
				L			_
						7	
						1	-
11		L	<u> </u>			J	1

WOODWARD-CLYDE CONSULTANTS

		_					EET OF 2
PROJECT	NAM		<u>COM</u>	MENO	EMENT BAY	– PR DA	TOJECT NO. <u>K81-4521</u> TE 10-11-82
	CBS-	04			r LOCATION Tacoma, Washington	RI	G Mobile B-61
 		·			BY G. Hess DRILLED BY S. Sterling	_ w	ATER ENTERS E1. 213
SURFACE	ELE	VATION		51	ELEVATION DATUM USC & GS		ATD
DEPTH 0	S TYPE	REC .	RESIST		DESCRIPTION	usc.	SPECIAL NOTES AND FIELD OBSERVATIONS
	DM .	12 12	4 9		Firm, dark brown-olive, low plastic Silty CLAY with some fine sand to Silty Sand Medium dense, brown, fine to medium grained, poorly graded SAND with trace	.SM	Boring advanced with 10" diameter hollow—stem augers with 11" diameter bit Sampler driven with 325 lbs. cable tool—jars OVA-0.4ppm
5—		12	5	-	of silt and fine to medium gravel		-
10	DM	12	7.	-	With less silt and gravel		OVA-0.4ppm
15	DM	12 12	5 8		· · · · · · · · · · · · · · · · · · ·		OVA-Background —
				-	Increasing fine gravel content		-
20-	DH	12 12	7 16	-	With some fine gravel		OVA-1.Oppm -
				-	Gravel content decreasing	-	
	DM	12/12	15 35	+	Becoming dense		0VA-0.8ppm
1 25-4		<u> </u>		1			استنبيت بالمستنب والمستنب والمستنبال

WOODWARD-CLYDE CONSULTANTS

PROJE	CT NAM	E	COM	MENCEMENT BAY		PROJECT NO. K81-4521
	CBS-			DJECT LOCATION Tacoma, Washington	1	DATE 10-11-82
L				GGED BY G. Hess DRILLED BY S. Sterling	· ·	RIG Mobile B-61 WATER ENTERS E1. 213
SURFA	CE ELE	VATION		ELEVATION DATUM USC & GS		ATD
DEPTH	TYPE	REC	RESIST	DESCRIPTION	u.s.	C. SPECIAL NOTES AND FIELD OBSERVATIONS
-				SAME: Dense, brown, fine to medium grained, poorly graded SAND with trace of silt and gravel	SP	
-	DM	12 12	13 25	-	4	0VA-0.6ppm
30					=	
-	, DM	12	12	<u>-</u>	4	-
35-		12	27			OVA-0.85ppm
-				-	1	Water detected
40-	DM	12 12	10			OVA-2.2ppm
-					+	-
-	DM	6/6	30		1	OVA-0.2ppm
45-				i	+	43.5' -
-					4	-
_				WOODWARD-CLYDE CONSULTANTS		FIGURE NO. B-8

				BORING LOG		
DDA IE	-T NAM	F	COMM	NCEMENT BAY		EET 1 OF 2
PROJEC	T NAM			NOTICE OF S		TE
	CBS-	10	PR	JECT LOCATION Tacoma, Washington	RI	G
				SED BY G. Hess DRILLED BY S. Sterling		ATER ENTERS El. 219
SURFAC	E ELE	VATION	2	5ELEVATION DATUMUSC & GS	_	ATD
DEPTH		REC	RESIST	DESCRIPTION	r s.c.	SPECIAL NOTES AND FIELD OBSERVATIONS
0 -	DM	<u>9</u> 12	3 11	Medium dense, dark brown, fine grained, poorly graded Silty SAND with some fine gravel and organics	SM	Boring advanced with 10" diameter hollow—stem augers with 11" diameter bit — Sampler driven with 325 lbs. cable tool—jars
5—						OVA-1.Oppm -
10-	DM	6/6	28	Dense, brown, medium grained, poorly graded SAND with some fine to medium gravel	SP	OVA-1.6ppm
-				With trace of coarse gravel	į	-
15	DM	12 12	20 15	-		OVA-0.2ppm
-	DM	12 12	9 12	Medium dense, light brown, fine grained, — poorly graded SAND with trace of silt and clay		
20 				- - -		
	DM	12	14			OVA-2.2ppm
25				WODDWARD-CLYDE CONSULTANTS		FIGURE NO. B-18

			00141		PUPUP DAY			EET 2 OF 2
PROJE	CT NA	ME	COM	HENC	EMENT BAY:		- PR	OJECT NO. <u>K81-4521</u> TE 10-12-82
		-10	PR	OJEC	T LOCATION Tacoma, Washington		1017	Mobile B-61
L			م ب	GGED	BY G. Hess DRILLED BY S. Sterli ELEVATION DATUM USC & GS	ng	W	TER ENTERS E1. 219
SURFA	CE EI	EVATION	٠	255	ELEVATION DATUM USC & GS			ATD
DEPTH	TYPE	SAMPLE	RESIST		DESCRIPTION		usc	SPECIAL NOTES AND FIELD OBSERVATIONS
-				-	SAME: Medium dense, light brown, fine grained, poorly graded SAND with trace of silt and clay	-	·SP	
-	DM	12 12	9 16	 - -		_		OVA-0.6ppm
30				_				
-		12	-	_	Becoming dense	_		- -
35-	DM	12 12	22			_		OVA-0.4ppm —
				-		_		Water detected T
-	DM	12 12	8 23	-		_		-
40								OVA-7.8ppm
-				-	Becoming medium dense	-		. -
-	DM	12 12	4			-		OVA-3.4ppm
45				_		_		Bottom of boring 44.0'
-				-	·	-		-
-				F		-		_

WOODWARD-CLYDE CONSULTANTS

PROJECT NAME COMMENCEMENT BAY CBS-11 PROJECT LOCATION Tacoma, Washington LOGGED BY G. Hess DRILLED BY S. Sterling WATER ENTERS E1. 217 SURFACE ELEVATION 254 ELEVATION DATUM USC & GS ATD							SH.	EET 1 OF 2
TRECHING THE LOCATION Tacoma, Vashington LOGGED BY G. Hess DRILLED BY S. Sterling 25% ELEVATION DATUM USC 6. GS SUMFACE ELEVATION 25% ELEVATION DATUM USC 6. GS DEPTH SAMPLE DESCRIPTION DATUM USC 6. GS DEPTH REC RESET DESCRIPTION DATUM USC 6. GS LOSS, dark brown-black, fine grained, poorly graded Silty SAND FILL with trace of fine to medium gravel of fine to medium gravel DM 4 3 2 7	PROJEC	T NAM	E	COM	MENC	EMENT BAY		
SURFACE ELEVATION DEPTH STAMPLE DEPTH DE				7			_	
DEPTH SAMPLE DESCRIPTION U.S.C. FRECIAL NOTES AND PIELD OBSERVATIONS U.S.C. PIELD OBSERVATIONS DESCRIPTION U.S.C. PIELD OBSERVATIONS DESCRIPTION U.S.C. PIELD OBSERVATIONS PIELD OBSERVATIONS PIELD OBSERVATIONS DESCRIPTION U.S.C. PIELD OBSERVATIONS PIELD OBSERVATIO		CBS-	-11	PR	DJECT			
DESCRIPTION U.S.C. SPECIAL MOTES AND FIELD OBSERVATIONS PIELD OBSERVATIONS				_			- W/	
TYPE REC RESUST	SURFAC	E ELE	VATION		54	ELEVATION DATUM USC & GS		AID
Dock New	DEPTH	S	AMPLE			DESCRIPTION	u.s.c.	
DM 10 6 12 15 15 16 17 15 17 15 17 15 17 15 17 15 17 17	10+	ITPE	REC	RESIST			-	
DH 10 6 12 15 15 15 15 15 15 15					_			
DM 1/2 3 2 2 5 5 5 5 5 5 5 5							انا	stem augers with 11'
DM						· -	L	
DM 10 6 1 1 1 1 1 1 1 1 1	1 4	······································			_	<u>-</u>		
DM 6 12 2 1		DM	12	3				jars OVA-O Room
DM 6 12 1	1		,,,		_		1	OVA O.Oppm
DM 6 12 1	5—				—			_
10]]	•
10	7					•		
10	-				 -	-	1	
10					L	· .]	
10]	Nu	6	- 1			1	0VA-0.5ppm
Medium dense, light brown, medium grained, poorly graded SAND with trace of fine to medium gravel	$\mid \dashv$	חע	18		┝	-	┪	
Medium dense, light brown, medium grained, poorly graded SAND with trace of fine to medium gravel	10				<u> </u>	<u></u>	1	_
grained, poorly graded SAND with trace of fine to medium gravel					<u> </u>		 	
OVA-3.1ppm OVA-3.1ppm OVA-7.5ppm OVA-7.5ppm DM					-		SP	
DM 10 6 9 DM 10 6 9 DM 10 72 6 9 OVA-7.5ppm OVA-7.5ppm DM 6 12 25 DM 5 12 25 OVA-5.1ppm	-				-		4	
DM 10 6 9 OVA-7.5ppm OVA-7.5ppm DM 6 12 25 DM 5 12 25 OVA-5.1ppm						•	}	044 2 4
DM 10 6 9 20 Gravel content decreasing DM 6 12 25 Becoming dense OVA-7.5ppm OVA-5.1ppm	1 7	DM	10	1	Γ	•	1	UVA-3. Ippm
DM 10 6 9 Compared to the content decreasing Becoming dense OVA-7.5ppm OVA-7.5ppm OVA-7.5ppm OVA-5.1ppm	-		12	9	-	-	┨	
DM 10 6 9 Compared to the content decreasing Becoming dense OVA-7.5ppm OVA-7.5ppm OVA-7.5ppm OVA-5.1ppm	,]		L		j]
DM 12 9 Gravel content decreasing DM 6 12 DM 6 12 25 OVA-7.5ppm OVA-7.5ppm OVA-7.5ppm	ا را			1			1	
DM 12 9 Gravel content decreasing DM 6 12 DM 6 12 25 OVA-7.5ppm OVA-7.5ppm OVA-7.5ppm				1	-	-	1	
DM 12 9 Gravel content decreasing DM 6 12 DM 6 12 25 OVA-7.5ppm OVA-7.5ppm OVA-7.5ppm	4			Ī	ļ_		1	1
DM 12 9 Gravel content decreasing DM 6 12 DM 6 12 25 OVA-7.5ppm OVA-7.5ppm OVA-7.5ppm								
20 — Gravel content decreasing — Becoming dense — OVA-7.5ppm — OVA-5.1		DΗ	10	-		•	1	
20 - Gravel content decreasing - Becoming dense - OVA-5.1ppm - OVA-5.1ppm] -	חט	12	9	-	•	-	044-7 5
- Gravel content decreasing -	20	į						naw-1.3bbm
DM						_	} ']
DM 6 12 25 OVA-5.1ppm	-		1	ł	 -	Gravel content decreasing -	1	}
DM 6 12 25 OVA-5.1ppm				•	L	_]	
DM 6 12 25 OVA-5.1ppm]			1		Recoming dense	1	1
25 OVA-3. 1PPIII	-	РМ	6	12	-	becoming dense	1	
25		חע	12	25	L		4	OVA-5.1ppm
WOODWARD-CLYDE CONSULTANTS FIGURE AND B-20								}
	25					WOODWARD-CLYDE CONSULTANTS		FIGURE NO B-20

					SHE	ET OF2
PROJEC	T NAM	Ε	COMP	ENCEMENT BAY		JECT NO. K81-4521
			7			E 10-14-82
1	CBS-	11	PR	DJECT LOCATION Tacoma, Washington		Mobile B-61
				GED BY G. Hess DRILLED BY S. Sterling		TER ENTERS E1. 217
SURFAC	E ELE	VATION	3	54 ELEVATION DATUM USC & GS		ATD
DEPTH	S	AMPLE		DESCRIPTION	s.c.	SPECIAL NOTES AND
25	TYPE	REC	RESIST		\dashv	FIELD OBSERVATIONS
i i				SAME: Medium dense, light brown, medium SI	P	
		l 1		grained, poorly graded SAND with trace		·
1 4		1		of fine to medium gravel Medium dense, light brown, fine grained,	1	
				poorly graded SAND	ı	
1 -		10	14		- 1	-
1 1	DM -	1 12	14	,	ŀ	OVA-O.8ppm
1 7				7	Ì	٦
30-						
1 1]				
				Becoming light brown	ĺ	
				_	ł	
}		1			Ī	
-		10	19	- -		0VA-1.9ppm -
1	DM	12	23		ļ	
				7		
35				_	ı	
					- 1	
-					- 1	-
1 _				Medium dense, gray-brown, medium grained, poorly graded SAND		← Water detected — ATD —
				poorty graded sale	- }	אוט ד
-		12	21		1	OVA-2.8ppm
	DM	12	25		ļ	
-				7		
40-			}	_	- 1	*****
''			l			
-		i .	ļ	7	ł	-
_		1	1	_	j	_
1]		•	[
-		12	4	-	j	
	DM	12	8			OVA-1.8ppm
-					Γ	Bottom of boring
45		1	1	—	l	44.0'
1		1	i		1	
-	1	l	i	7	ļ	-
]	l		•	į	-
	1		1		1	
-	}	1	1	+	Ì	-
			1			_
-]			Ţ		
1	1	1	1	<u> </u>	J	

WOODWARD-CLYDE CONSULTANTS

							HEETOF
PROJECT	MAM!	E	COMM	EMENT BAY			PROJECT NO. K81-4521
	CBS-	12	٦	raz Abbaziani T	acoma, Washington		DATE 10-13-82 RIG Mobile B-61
L			_ PRO	D BY G. Hess	DRILLED BY S. Sterling		WATER ENTERS El. 212
SURFACE	E ELE	VATION			TION DATUM USC & GS		ATD
[5===:/		4445V F					SPECIAL NOTES AND
DEPTH		REC	RESIST	DESCR		u.s.	FIELD OBSERVATIONS
				Medium dense, poorly graded clay and trace	dark brown, fine grained, SAND and silt, with some of gravel	, SP SM	.10" diameter hollow
				Loose, light in grained, poor fine to medium	brown, fine to medium ly graded SAND with some m gravel	- SP	diameter bit — Sampler driven with 325 lbs. cable tool—
	DM	<u>6</u> 12	3 2			4	jars OVA-1.2ppm
				_			
	1	1					
1 1		Ì]	
1 1						1	1
1 4		10	4			4	OVA-Background
1 4	DM	10 12	4			4	-
10-			1	_		4	
	1		1			4	
				Becoming medi	um grained	4	
				•	•	4	0VA-0.6ppm
	DM	12	2 2				_
							_
15				-			
				. Becoming fine	to medium grained	1	-
-						7	-
-		12	6	·	•	4	-
	DM	12	10		•	4	OVA-0.2ppm -
20-	Ì			-			_
	Į						_
-				•		7	
-	İ		1	•		7	
-	DM	12	8	Becoming med coarse sand	ium dense with trace of	7	044-0-5
-	DA	12	15	Coarse sand	and graver	4	OVA-0.6ppm
29-		<u> </u>	ــــــــــــــــــــــــــــــــــــــ		WOODWARD-CLYDE CONSULTANTS		FIGURE NO B-22

WOODWARD-CLYDE CONSULTANTS

880 IF6		-	COM	ENCEMENT BAY		EET _ 2 _ OF _ 2
PROJEC			7			TE 10-13-82
	CBS-	12	PR	DJECT LOCATION Tacoma, Washington	RI	G Mobile B-61
SURFAC	E ELE	MOITAV:	ى ــــــــــــــــــــــــــــــــــــ	GGED BY G. Hess DRILLED BY S. Sterling 238 ELEVATION DATUM USC & GS	- w	ATER ENTERS E1. 212 ATD
DEPTH	S TYPE	AMPLE REC	RESIST	DESCRIPTION	usc	SPECIAL NOTES AND FIELD OBSERVATIONS
				SAME: Medium dense, light brown, fine to medium grained, poorly graded SAND with some gravel	SP	₩ater detected — ATD —
	DM	10 12	8 30	- -		OVA-4.0ppm
30 —	,			-		
	DM	6 12	7	- -		 OVA-Background
35	-	12	15	<u>-</u>		Bottom of boring
-				- -		- -
-				-		-
				-	1	
				 -	1	-
_				-		_
-				- -		
_				- -		
		-1	<u></u>	WOODWARD-CLYDE CONSULTANTS		FIGURE NO. B-23

						EET1 OF4
PROJECT	MAM 1	Ε	COM	ENCEMENT BAY		OJECT NO. K81-4521
	CBS-	17	7	JECT LOCATION Tacoma, Washington		TE 11-4-82 G Speedstar SS15
L		<u> </u>	PR	JECT LOCATION Tacoma, Washington GED BY M. Doolan DRILLED BY R. Ostgoodby		ATER ENTERS E1. 224
SURFACE	F FIF	VATION		33 ELEVATION DATUM USC & GS	-	ATD
					_	
DEPTH		REC	RESIST	DESCRIPTION	usc	SPECIAL NOTES AND FIELD OBSERVATIONS
0				Dense, brown, poorly graded, medium grained Gravelly SAND with some silt and trace of clay	SP	Boring advanced with air rotary rig, using 7 7/8" tricone roller bit Sampler driven with 350 lbs. cable tool jars
1 4					-	4
	,			Dense, brown, poorly graded, medium Sandy GRAVEL with some silt and trace of clay	GP	_
1 4				<u>.</u>	-{	
1 1					<u> </u>	Water detected
10_		12	_	Loose to medium dense, brown-gray, poorly graded, medium to coarse grained Gravelly-	SP	ATD OVA-2.0ppm
	DM 	12	9	SAND with some silt and trace of clay -		Boring continued with 5 7/8" tricone roller bit with air—and 6" diameter
				<u>-</u>	4	welded steel casing— with top drive casing hammer—
15—				Becoming dense	4	
	!			 With occasional layers of dense, gray, Sandy SILT with trace of clay and gravel 	HL W	_
1	,			<u> </u>		
	DM	12	50	Gravel content decreasing		0VA 5.0ppm
20-					_	
20-]		_]	_
1				7	7	
		1		-	7	
4				-	4	-
			1		4	_
7		1			1	
25		.l	·	WOODWARD-CLYDE CONSULTANTS		FIGURE NO. B-24

PROJECT	T NAM	E	СОМ	MENC	EMENT BAY	PI	HEET 2 OF 4 ROJECT NO. K81-4521
	CBS-	-13	PR	OJEC GGED	T LOCATION Tacoma, Washington BY M. Doolan DRILLED BY R. Ostgoodby	R	ATE 11-4-82 IG Speedstar \$\$15 VATER ENTERS E1. 224
SURFACE	E ELE	VATION	·	233	ELEVATION DATUM USC & GS		ATD
DEPTH 25	S TYPE	REC	RESIST		DESCRIPTION	u.s.c	SPECIAL NOTES AND FIELD OBSERVATIONS
				_	SAME: Dense, gray, poorly graded, medium grained SAND with some medium to coarse gravel and trace of silt and clay	SP	
	DM	12 12	37	-	•	-	
} +	-	12	- 3/	-		4	0VA-0.6ppm
30			•	<u> </u>	•		_
				ļ_		4	
	į						
					4		
1	!		·	Γ	Becoming more gravelly with fine to	7	
				 	medium gravel	4	
35				-			-
				-		4	
				_	•	4	
	DM	<u>0</u> 12	75				
LT				Γ		7	
40-				 -	•	_	-
-				-		4	
-				-	With layers of dense, brown-gray,	- w/	
]					poorly graded, Sandy GRAVEL	GP	
1						7	
45-				-	•	\dashv	-
				L		4	
]	į				Very dense, brown-gray, poorly graded,	GP	
	DM	<u>8</u> 12	120		medium to coarse grained GRAVEL with some sand and trace of silt	7	0VA-4.0ppm
1 +	<u></u>	12		-	Same the shade of entre	4	OVA-4.Oppm

WOODWARD-CLYDE CONSULTANTS

PROJEC	CT NAI	AE	СОН	SENCEMENT BAY		DECT NO. K81-4521
			$\overline{}$	DA'	TE 11-5-82	
	CBS	-13		JECT LOCATION Tacoma, Washington	•	Speedstar SS15
SURFAC	CE EL	EVATION		GED BY M. Doolan DRILLED BY R. Ostgoodby 33ELEVATION DATUM USC & GS	. w.	ATER ENTERS E1. 224
DEPTH		REC	REGICT	DESCRIPTION	u.s.c.	SPECIAL NOTES AND FIELD OBSERVATIONS
50 -		1,,,,,	11000	SAME: Very dense, brown-gray, poorly	GP	FIELD OBSERVATIONS
-				graded, medium to coarse grained GRAVEL -	ur	. 4
				with some sand and trace of slit	W/	
1				- With dense, gray, medium sand lenses -	SP	
				- ,		-
4				<u>.</u>		
55-					Ì	
ر در						
				-		
-				Increasing coarse sand content		_
				<u></u>		
	DM	12	120	- -		OVA-4.4ppm
-		1 12		-		-
60-				-		
-				-		
-				Varu dana aran bar w		_
				Very dense, gray-brown, medium grained - SAND with some medium gravel and trace — of silt	SP	-
				-		-
65				Very dense, gray-brown, fine to medium grained Sandy GRAVEL with some silt	GP	-
-				•		-
				-		
	DM	4 12	50	Becoming coarse		OVA-0.6ppm
-		12		-		
70—						
-				-		-
-				<u>-</u>		-
				_		
				·		_
				-		-
75 —						
	•			WOODWARD-CLYDE CONSULTANTS		FIGURE NO. B-26

DBO IE	CT NAS	45	LUM	SENCEMENT BAY		EET4 OF4 OJECT NOK81-4521
PROJE			7	interient par	DA	TE 11-5-82
	CBS	-13		DJECT LOCATION Tacoma, Washington		G Speedstar SS15
SURFA	CE ELI	EVATION		GGED BY M. Doolan DRILLED BY R. Ostgoodby 33 ELEVATION DATUM USC & GS		ATER ENTERS E1. 224
DEPTH		SAMPLE				encolal Motes Ave
75 -	TYPE	REC	RESIST	DESCRIPTION	u.s.c.	SPECIAL NOTES AND FIELD OBSERVATIONS
-				SAME: Very dense, gray-brown, fine to medium grained Sandy GRAVEL with some silt Silt content increasing	GP.	_
		İ	1			
	DM	8 12	30	-	GM	OVA-4.6ppm
-	-	1-12	 -	-	4	_
80—			}	-		
_		}		-	4	
_			İ			_
-				Dense, gray-brown, highly plastic Clayey with sand and trace of gravel	МН	_
85—				Dense, brown-gray, poorly graded, Silty SAND with some gravel	SM	<u>-</u> -
-	1			-	4	-
-		}		_	4	_
_		<u> </u>	<u> </u>	<u>-</u>		_
_	DM	12	67	-		OVA-2.Oppm -
90-	{			-	-	-
-	}				4	-
l _]	İ				_
-	1		1	_	. 🕇	-
-	1			-	4	•
95	-			-	4	-
]					_
			1			
-	1			-	7	•
-		12		-	-	OVA-0.8ppm
-	DM	12	72	·	4	Bottom of boring
100	 	<u> </u>	<u> </u>	<u> </u>		99.0'
	J			WOODWARD-CLYDE CONSULTANTS		FIGURE NO. B-27

APPENDIX C WELL INSTALLATION REPORTS SOUTH TACOMA SWAMP PRELIMINARY SITE INVESTIGATION

roject _	COMMENCEMENT BAY		Piezometer No. CBS-01 Location Tacoma, Wa.		
roject N	o. <u>K81-4521</u> Installed B	, м.	Geroud Date 10-11-82 Time 1550		
•			S-01 for details.		
 					
		·-····································			
	LOG OF E	ORING	AND PIEZOMETER		
	BORING		PIEZOMETER Type of Piezometer Monitoring Well		
Cepth in Ci.	Description	Symbol	Ground Elev. 238.6 Top of Steel 240.8		
	See Boring Log CBS-01 for detailed description		Li* 2.2 Lg* 8.0 Lg* 17.0 Lg* 27.2 Lg* 10.0 Lg* 27.2 Lg* 10.0 Lg* 27.2 Lg* 10.0 Lg* 27.2 Lg* 10.0 Lg* 27.2 Lg* 10.0 Lg* 27.2 Lg* 10.0 Lg* 27.2 Lg* 10.0 Lg* 27.2 Lg* 10.0 Lg* 27.2 Lg* 10.0 Lg* 27.2 Lg		
marks_	Protective casing stick-u	2.21			

WOODWARD - CLYDE CONSULTANTS

Installed By G. Hess Dote 10-13-82 Time 1120	Project No. K81-4521 Ins Method of Installation See Bo LOG BORING Description See Boring Log CBS-0	oring Log CBS	Dote 10-13-82 Time 1120 -02 for details.
LOG OF BORING AND PIEZOMETER BORING Description See Boring Log CBS-02 for details. FIEZOMETER Type of Piezometer Monitoring Well Ground Elev. 240.3 Top of Steel 241.7! Riser Elev. Vented Cap. See Boring Log CBS-02 for detailed description Li. 1.5' Li. 20.0' Li. 1.5' Li. 20.0' Li. 20.0' Li. 20.0' Li. 3.0' Li. 3.0' Li. 5.0' Li. 5.0' Li. 5.0' Li. 5.0' Li. 5.0' Li. 5.0' Li. 5.0' Li. 5.0' Li. 5.0' Li. 5.0' Li. 5.0' Li. 6.0' Li. 7.0' Li.	BORING BORING Description See Boring Log CBS-0		-02 for details.
BORING PIEZOMETER Type of PiezometerHonitoring Well Ground Elev240_3	BORING Description See Boring Log CBS-0	OF POPING	AND DISTONETED
BORING PIEZOMETER Type of Piezometer Monitoring Well	BORING Description See Boring Log CBS-0	, OE BODING	AND DISTONETED
BORING PIEZOMETER Type of Piezometer Honitoring Well	BORING Description See Boring Log CBS-0	OF BODING	AND DISTONETED
BORING Description See Boring Log CBS-02 for detailed description See Boring Log CBS-02 for detailed description See Boring Log CBS-02 for detailed description Li, 1.5' Le, 20.0' Le, 7.0' Le, 7.0' Le, 5.0' Le, 6.0'	BORING Description See Boring Log CBS-0	י און מארטואור	' AND DIETOMETER
Type of Piezometer Monitoring Well Ground Elev. 240.3 Top of Steel 241.7/ Riser Elev. Vented Cap See Boring Log CBS-02 for detailed description See Boring Log CBS-02	Description See Boring Log CBS-C	OF BURING	
See Boring Log CBS-02 for detailed description Live 1.5 Live 6.0 Live 6.0 Live 22.5 Live 5.0 Live 33.0 Live 5.	See Boring Log CBS-C		
See Boring Log CBS-02 for detailed description Live 1.5 Live 1.5 Live 20.0 Live 30.0 Live 20.0 Live 20.0 Live 20.0 Live 20.0 Live 20.0 Live 20.0 Live 20.0 Live 20.0 Live 20.0 Live 20.0 Live 20.0 Live 20.0 Live 20.0 Live 20.0 Live 20.0 Live 30.0 Live 20.0 Live 30.0 Live 20.0 Live 30.0 Live 20.0 Live 30.0 Live 20.0 Live 30.	See Boring Log CBS-C	ymbol	Ground Elev. 240.3 Top of Steel 241.78
emorks Protective casing stick-up 1.5'.	emorks_Protective casing st	02 ption	Lio 1.5' Lg. 20.0' Lg. 6.0' Lg. 29.5' Lg. 29.5' Lg. 33.0

WOODWARD - CLYDE COMBULTANTS

	No. K81-4521 Installed By		
Depth in ft.		RING	S-03 for details. S AND PIEZOMETER PIEZOMETER Type of Piezometer Monitoring Well Ground Elev. 249.4 Top of Steel 251.14 Riser Elev.
	See Boring Log CBS-03 for detailed description Protective casing stick-up		Li Vented Cap LD of Riser Pipe 2 in. Type of Pipe PVC Sched. 40 Type of Backfill Around Riser Cement - Bentonite Grout Top of Seal Elev. 219.7 Type of Seal Material Bentonite Sturry La 5.0 La 8,0 La 5.0 La 5.0 La 5.0 La 5.0 La 6.0
			C-3 Inspected By G. Hess

WOODWARD - CLYDE CONSULTANTE

	LOG OF BO	DRING	AND PIEZOMETER PIEZOMETER
	BORING	•	Type of Piezometer Monitoring Well
Depth in ft.	Description	Symbol	Ground Elev. 250.8 Top of Steel 252.30 Riser Elev. Vented Cap
lemarks	See Boring Log CBS-04 for detailed description Protective casing stick-up	1.5'	Lio de Riser Pipe 2 In. Type of Pipe PVC Sched. 40 Type of Backfill Around Riser Cement - Bentoni Grout Top of Seal Elev. 222.8 Type of Seal Material Bentonite Slurry Top of Filter Material Traction Sand Size of Openings 0.010 Diameter of Piezometer Tip 2 in. i.D. Bottom of Piez Elev. 207. Bottom of Boring Elev. 207. Diameter of Boring 11 in

Project I	COMMENCEMENT BAY No. K81-4521 Installed By _ of Installation See Boring Log		Piezometer No CBS-05 Location Tacoma, Wa. Hess Date 1300 S-05 for details.
Depth in fl.	LOG OF BO	RING	AND PIEZOMETER PIEZOMETER Type of Piezometer Monitoring Well Ground Elev. 236.9 Top of Steel 239.28 Riser Elev.
	See Boring Log CBS-05 for detailed description		Li Vented Cap ID. of Riser Pipe 2 in. Type of Pipe PVC Sched. 40 Type of Backfill Around Riser Cement-Bentonit Grout Top of Seal Elev. 222.2 Type of Seal Material Bentonite Slurry Li 5.0 Li 5.
Remarks	Protective casing stick-up 2	2.41	Bottom of Piez Elev. 209.2 Bottom of Boring Elev. 207.9 Diameter of Boring 11 in.

	COMMENCEMENT BAY		Piezometer No. CBS-06 Location Tacoma, Wa.
	Na. K81-4521 Installed By		
Method (of Installation See Boring Lo	g CBS	5-06 for details.
			
	LOG OF BO	RING	
	BORING		PIEZOMETER Type of Piezometer Monitoring Well
Depth in ft.	Description	Symbol	Ground Elev. 233.1 Top of Steel 234.37
emarks	See Boring Log CBS-06 for detailed description Protective casing stick-up	-	Li Vented Cap LD of Riser Pipe 2 in. Type of Pipe PVC Sched. 40 Type of Backfill Around Riser Cement - Bentonite Grout Top of Seal Elev. 221.3 Type of Seal Material Bentonite Slurry La 5.0 La 6.0 Top of Filter Elev. 216.3 Type of Filter Material Traction Sand Size of Openings 0.010 in Diameter of Piezometer Tip 2 in. 1.0. Bottom of Piez Elev. 205.3 Bottom of Boring Elev. 205.1 Diameter of Boring 11 in
		- <u></u>	C-6 Inspected By G. Hess
			WOODWARD - CLYDE COMBULTAN

Project N			S-07 for details.		
Depth in ft.	Description	Symbol	Ground Elev. 254.4 Top of Steel 255.40 Riser Elev. Vented Cap		
	See Boring Log CBS-07 for detailed description		Lie 1.0 Le Sched. 40 Type of Pipe PVC Sched. 40 Type of Backfill Around Riser_Cement-Bentonite Grout Tap of Seal Elev. 219.4 Type of Seal Material Bentonite Slurry Le 5.0 L		
Remarks.	Protective casing stick-up .	95'	Diameter of Boring 11 in.		
			c - Inspected D., M. Garoud		

Project	COMMENCEMENT BAY			ezometer No. <u>CBS-08</u>
	No. K81-4521 installed By	М.		cotion <u>Tacoma, Wa.</u> te <u>10-13-82</u> <u>Time</u> 1630
	<u>-</u>			16 10 10 10 10 10 10 10 10 10 10 10 10 10
Method			-08 for details.	
<u> </u>	LOG OF BOR	ING	AND PIEZOMETE	
	BORING		Type of Piezometer_	PIEZOMETER Monitoring Well
Depth in ft.	Description	Symbol	Ground Elev. 224.0	Top of Steel 226.44 Riser Elev.
Remark	See Boring Log CBS-08 for detailed description Protective casing stick-up 2	. 41.	L ₁ = 2.4 L ₂ 5.0 L ₃ = 6.0 L ₄ = 7.0 L ₅ = 5.0 L ₇ = 18.0 L ₇ =	LD. of Riser Pipe
			C-8 Inspec	cted By M. Geroud WOODWARD-CLYDE CONSULTANT

Project _	COMMENCEMENT BAY			Piezometer No. <u>CBS-09</u> Location Tacoma, Wa.
Project I	No. K81-4521 Installed By	G. H		Date 10-11-82 Time 1600
Method (-09 for details.	······································
			· · · · · · · · · · · · · · · · · · ·	
			 	
	LOG OF BO	RING	AND PIEZOME	
	BORING		Type of Piezometer	PIEZOMETER r_Monitoring Well
Depth in ft.	Description	Symbol	Ground Elev. 242.	Riser Elev.
	· · · · · · · · · · · · · · · · · · ·	+ 5,	1 1	Vented Cap
	See Boring Log CBS-09 for detailed description		La- 30 L7 La- 30.1' La- 5.0' L7- 34.0'	LD. of Riser Pipe 2 in. Type of Pipe PVC Sched. 40
Remarks	Protective casing stick-up	1.61	•	
			······································	
				C No.
			c-9 Ins	spected By G. Hess

roj ect	COMMENCEMENT BAY	····	Piezometer No. CBS-10 Location Tacoma, Wa.
roject No	n. K81-4521 installed By_	G.	Hess Date 10-12-82 Time 1045
lethod of	Installation See Boring Lo	g CB	S-10 for details.
	£		
	LOG OF BO	RING	AND PIEZOMETER
	50 DING		PIEZOMETER
	BORING		Type of Piezometer Monitoring Well
Depth in ft.	Description	Symbol	Ground Elev. 255.2 Top of Steel 256.45
<u> </u>		S	Vented Cap
	See Boring Log CBS-10 for detailed description		Lo of Riser Pipe 2 in. Type of Pipe PVC Sched. 40 Type of Backfill Around Riser Cement-Bentonite Grout Top of Seal Elev. 225.2 Type of Seal Material Bentonite Slurry Top of Filter Material Traction Sand Size of Openings 0.010 in Diameter of Piezometer Tip 2 in. i.D. Bottom of Boring Elev. 211.2 Diameter of Boring 11 in.

Project _	COMMENCEMENT BAY		Location	NoCBS-11 Tacoma, Wa.
	No. K81-4521 Installed By			-14-82 Time 1000
Method o	of Installation See Boring Lo	g CBS	-11 for details.	
		· · ·		
	LOG OF BO	RING	AND PIEZOMETER	
	BORING		PIEZON Type of Piezometer Monito	
Depth in ft.	Description	Symbol	Ground Elev. 253.8	Top of Steel 254.68
9=		<u>\</u>	11.	Vented Cap
	See Boring Log CBS-11 for detailed description		L ₁ ·	Type of Pipe PVC Sched. 40 Type of Backfill Around Riser Cement-Bentonite Grout Top of Seal Elev. 222.6 Type of Seal Material Bentonite Slurry Top of Filter Elev. 217.6 Type of Filter Material Traction Sand Size of Openings 0.010 i Diameter of Piezometer Tip 2 in. 1.0.
		•		—Diameter of Boring 11 in.
Remarks	Protective casing stick-up	0.9'		Bottom of Boring Elev. 20Diameter of Boring 11

LOG OF BORING AND PIEZOMETER BORING Type of Piezometer Monitoring Vell Ground Elev. 238.5 Top of Steel 240.7 Riser Elev. Vented Cap Vented Cap Ly 2.31 Ly 19.01 Ly 30.11 Ly 30.11 Ly 33.01 Top of Steel 240.7 Riser Elev. Vented Cap Ly of Riser Pipe 2 in Type of Pipe PVC Sched. 44 0 Type of Bockfill Around Riser Cement-Benton Grout Top of Seal Material Traction Sand Size of Openings 0.016 Diameter of Piezometer Tip 2 in. 1.0. Bottom of Piez Elev. 205 Bottom of Piez Elev. 205 Bottom of Piez Elev. 205		COMMENCEMENT BAY No. K81-4521 Installed By of Installation See Boring Lo		Hess [Date 10-1	Tacoma, 3-82 T		1315
Sched. 40 Type of Backfill Around Riser Cement-Benton Grout Top of Seal Elev. 219.5 Type of Seal Material Bentonite Slurry Ls. 30.1' Ls. 5.0' Ly. 33.0' Top of Filter Elev. 213. Type of Filter Material Traction Sand Size of Openings 0.010 Diameter of Piezometer Tip 2 in. 1.0. Bottom of Piez Elev. 205 Bottom of Piez Elev. 205		LOG OF BO BORING Description See Boring Log CBS-12	RING	AND PIEZOMET Type of Piezometer Ground Elev. 238.	ER PIEZOME Monitor	Top of Riser Ven	f Ster Elev ited Co	ipe <u>2 in.</u>
Traction Sand Size of Openings 0.010 — Diameter of Piezometer Tip 2 in. 1.D. Bottom of Piez Elev. 205	· · · · · · · · · · · · · · · · · · ·			L ₁ • 2.3' L ₂ • 19.0' L ₃ • 5.8' L ₄ • 8.0' L ₆ • 30.1' L ₆ • 5.0'		Scheen Type of Riser Country Top of S Type of Bento	Back! Cemen t Seal El Sonite	Fill Around t-Bentoni lev. 219.5 Material Slurry
Diameter of Boring 11	-		-			Training Tra	Opening of Piez	Sand ngs 0.010 liezometer n. 1.D. Elev. 205.

APPENDIX K

PLASMA SPECTROMETER ANALYSES - UNDATED

PLASMA SPECTROMETER ANALYSIS

Samples 6826-A, 6826-B and 6826-C

	Α	В	· C
	Composite samples	Composite Samples	Lump from Foundry
	from Slao Wall	from Foundry Pkg Lot	Parking Lot
Aluminum	3.04	.14	.12
Antimony	< .0081	.21	< .0001
Arsenic	.004	.013	< .8001
Barium	2.28	.027	.048
Beryllium	< .0001	< .0001	< .0001
Bismuth	< .8001 .	< .0001	< .0001
Boron	< .0001	< .0801	< .0001
Cadmium	.0002	.0019	.0013
Calcium	6.47	.065	.033
Cerium	< .0001	< .0001	< .0001
- Chromium	.0070	< .0001	< .0001
Cobalt	.0003	.0004	< .0001
Copper	.0007	3.65	.0046
Germanium	< .0001	< .0001	< .0001
Gold	< .0001	< .0001	< .0001
Iron	.98	1.19	.047
Lanthanum	.016	< .0001	.0056
Fead	.0088	13.67	.27
Lithium	.0035	< .0001	.0004
Magnesium	.21	.821	.0030
Manganese	1.58	.019	.0087
Molybdenun		< .0001	< .0001
Niobium	< .0001	< .0001	< .0001
Neodymium	< .0001	< .0001	< .0001
Nickel	.0002	.019	.0003
Palladium	< .0001	< .0001	< .0001
Phosphorou		< .0001	.70
Platinum	< .0001	< .0001	< .0001
Potassium	.24	.016	.0049
Rhodium	< .0001 < .0001	< .0001	(.0001
Rubidium	< .0001	< .0001	< .0001
Scandium	(.0001	(.0001	(.0001
Silver	< .0001	< .0001	< .0001
Sodium	.16	.0086	.012
Strontium	.036	.0004	.0017
Tin	⟨ .0001	1.58	(.0001
Titanium	.12	.0865	.0039
Thorium	(.0001	1000.	1999. >
Tungsten	< .0001	< .0001	< .0001
Uranium	(.0001	< .0001	(.0001
Vanadium	.0072	.0043	.0085
Yttrium	- < .0001	(.0001	<0001
Zinc	.0805	3.15	.011
Zirconium	.025	.0017	< .0001

Results of Preliminary Samples (Surface Grab Samples) Prior to Resource Studen

APPENDIX L

RESOURCE EVALUATION OF ANDERSON ENTERPRISES SOUTH TACOMA PROPERTY - 1985



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RESOURCE EVALUATION OF
ANDERSON ENTERPRISES
SOUTH TACOMA PROPERTY

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RESOURCE EVALUATION

PAGE ONE

INTRODUCTION

On February 6, 1985, Earth Consultants, Inc. in association Bennett Laboratories of Tacoma, Washington authorized to proceed with soil sampling and a chemical testing program for the evaluation of the potential resource from industrial fills which has been placed over an area of roughly one hundred fifty thousand (150,000) square feet (3.5 acres) on the Anderson property in South Tacoma, Washington. This report documents the distribution of fills in the potential resource area, and presents the results of chemical testing along with methods employed to perform the various technical tasks.

SCOPE OF WORK

Activities performed for the evaluation of fill soils at the site can be divided into the following elements:

- A review of the existing body of chemical and hydrologic data for the site.
- Development and implementation of a safety plan the site. tuned to anticipated physical layout and potential contamination.
- sampling and transport of soil samples to the laboratory.
- Chemical analyses.
- all test results and and compilation of Review preparation of summary report.

METHODOLOGY

Preliminary Review and Preparation

Site Visit

Prior to commencement of actual field work for the sampling an effort was made to review the physical distribution of potentially contaminated soils at the site A to a might be a second of the second of th

- - -<u>-</u>-

RESOURCE EVALUATION PAGE TWO

at 5202 South

and to assess possible difficulties such as adverse terrain, utilities, etc. Thomas R. Anderson provided a tour for the entire site, which is located on Proctor Street, north of South 56th Street in south Tacoma, Washington. (See Vicinity Map, Plate 1).

Safety Plan

The technical team places considerable emphasis on maintaining the safety and health of personnel in the field associated with sampling programs such as the one undertaken for this project. A safety plan was developed specifically for application to the Anderson property project and appears as Appendix B to this report. The document provides for precautions, personal safety equipment, decontamination and safety procedures, including emergencies.

Criteria for the safety plan and designation of personal equipment including proper respirators and outerwear were developed by reviewing data from preliminary laboratory test results from Bennett Laboratories, as well as reconnaissance level sampling and testing results compiled for the South Tacoma Swamp Study for the U. S. Environmental Protection Agency. Considerations included metals with possible PAH concentrations at some locations.

Sample Collection

Survey and Staking

Prior to actual sampling, it was deemed necessary to establish a control grid on the ground which contribute to the overall efficiency of the field sampling, provide added resolution for later analyses laboratory test results. Using a geologist's Brunton compass and reel tape, baselines tied to known fixed referenced points including building walls were established; stationing along the baselines in addition to distance measurements from the baselines made it possible to locate each sampling location with a fair degree of accuracy within limits implied by these methods.

Excavation and Sampling

The excavation sub-contractor retained for this phase of work was Continental Dirt Company of Kent, Washington.

RESOURCE EVALUATION PAGE THREE

Equipment employed for the actual sampling exavation consisted of a track-mounted Hitachi Model T1720261 backhoe with a reach-capability of twenty two (22) feet and a fifty six (56) inch bucket width.

Under the supervision of the field geologist, the backhoe was brought into position over each sampling location. As conditions permitted, each test pit was excavated and sequentially sampled with the maximum depth for each pit being controlled by the thickness of the fill deposits overlying the natural undisturbed native soils. As one of the overall objectives for the program was to define the thickness for potentially contaminated materials, each pit was advanced to a depth below the contact between fill and native soils.

Upon completion of each excavation a scale detailed log was made of each test pit. Logging procedure consisted of a visual inspection of the pit followed by notation of features including soil types, lithologic significant contacts, cultural debris and sample locations. as reference with adjacent to each pit was used Photographs vertical control provided by a small hand tape. were taken of particular locations and/or interest.

Samples taken from various depths in each pit were placed in prepared labeled glass jars furnished by Bennett Laboratories.

Sample jars were stored in ice-packed chests at the site and were transferred to the lab daily during the sampling program to minimize excessive dissipation of volatile fraction hydrocarbons. Each jar was clearly labeled as to test pit number, sample number, geologist, site name and date.

To establish chain of custody, transfer in the field was documented on a standardized sample control form by logging sample numbers or lots as they were received by laboratory personnel.

RESOURCE EVALUATION PAGE FOUR

Chemical Analytical Testing

A workplan generally similar to those used for resource evaluations connected with known ore bodies was followed for the assessment of the site for possible commercial exploitation of Lead bearing materials. In this respect, both vertical and horizontal distribution of Pb were determined throughout the fill material and total tonnage estimated based on vertical exploration to depth of native soils underlying the fill, and horizontally to the extent of fill-native contacts on the surface.

Total Pb values were determined by first preparing samples in the usual manner in which mining assays are prepared. Samples were crushed to - 3/8 inch by chipmunk crusher, then pulverized to - 200 mesh, unless the sample consisted of fine, soft material (which smears badly on pulverizer plates) in which case the sample was screened to - 80 mesh. Samples were digested with hot concentrated Nitric Acid and subsequently analyzed by atomic absorption spectrophotometry. Total Arsenic was analysed as well for both resource and environmental evaluation purposes.

An added dimension to this program was the use of a backhoe, rather than a drill, to obtain samples at depth. By utilizing this method, an extensive visual examination of fill materials was possible to help better delineate fill composition and homogeniety.

RESULTS OF INVESTIGATION

Distribution of Slag-Fill Deposits

The Test Pit Location Plan, Plate 2, illustrates the position of various test pits and sampling locations for this study in relation to existing access roads, buildings and topography in the area.

The topography portrayed on the Test Pit Location Plan, Plate 2 highlights a north-south (treding) slope which separates an elevated plateau to the east which supports the existing foundry building from lowlands to the west. It is apparent that the toe of the slope marks the general maximum western extent for the slag/fill materials encountered in the test pits.

NERT

RESOURCE EVALUATION PAGE FIVE

A review of the Test Pit Logs, Plates 5 through 19 reveals that the fill material is comprised of an assortment of slag fragments, refractory bricks, black fine silty-sand, scrap metal, metal cuttings and cinder fragments. A preliminary estimate for the volume of industrial fill in-place west of Proctor Street and south of Test Pits TP-15, TP-16 and TP-17 based upon topographic expresssion and available test pit data is roughly 45,000 to 50,000 cubic yards.

REFERENCES

Black and Veatch, June 1983, Preliminary Site Investigation, South Tacoma Swamp, Tacoma, Washington, USEPA Contract Number 68-03-1614, work assignment Z-3-6, 93 pages.

Walters, K.L., Kimmel, Grant E., 1968, Groundwater Occurrence and Stratigraphy of Unconsolidated Deposits, Central Pierce County, Washington: Water Supply Bulletin No. 22 Washington Department of Natural Resources.

RESOURCE EVALUATION PAGE SIX

TABLE I
TEST PIT DATA COMPILATION

Test Pit Number	Total Depth (FT)	Thichness of Fill	Maximum Lead Concentration (PPM)
1	14.0	8.0	1250
2	18.0	13.0	N/D
3	14.5	10.0	138
4	18.0	13.5	5690
5	13.0	8.0	1640
6	15.0	10.0	87200
7	17.5	13.5	752
8	18.0	13.0	2900
9	15.0	10.0	1180
10	15.0	11.0	455
11	17.0	13.0	694
12	17.0	13.0	N/D
13	16.0	11.0	1130
14	11.0	7.0	125

N/D = No Data

RESOURCE EVALUATION PAGE EIGHT

TABLE II

TOTAL LEAD AND ARSENIC - RESOURCE EVALUATION

	Pb ppm	As ppm	
TP1, 2' TP3, 1' TP4, 0'5' TP4, 2.5' TP4, 6.5' TP4, 14' TP5, 1'-2' TP6, Surface TP6, 6' TP6, 15' TP7, 1.5' TP7, 1.7' TP8, 2' TP8, 7'	1250 138 5690 3530 581 39 1640 87200 621 60 752 26 2900 313	.18 .03 .12 .05 .14 .16 N/D .05 .16 .03 .12 .08 .16	
TP8, 17' TP9, 9' TP9, 15' TP10, 1' TP10, 6' TP11, 2'-3' TP11, 10'-12' TP11, 16'-17' TP13, 3'-5' TP13, 7'-11' TP14, 2'-5' TP25, 4.5'-6' (Precip.) Surface Grab	313 30 1180 43 455 267 69 457 694 27 1130 129 125 477 16500	.16 .14 .17 .16 .20 .17 .11 .15 .14 .11 .20 .16 N/D	

N/D - No Data

Follow Page 52

RESOURCE EVALUATION PAGE NINE

TEST RESULTS AND CONCLUSIONS

Comparing between test

Vertical distribution of total Pb values is inconsistent with depth, although values drop in each test pit location as depth of sample increases. Small (approx. 1 cu. ft.) to large (approx. 100 cu. ft.) lenses of diverse materials are scattered throughout the fill at various depths, serving to add to the inhomogeniety of the fill.

The vast majority (particularly larger volume lenses) of the inclusions are siliceous slag of unknown origin. Grab samples of this material reveal virtually no significant content other than silica. Pieces of slag range from small fragments up to approx. 18 in. pieces and "welded" zones of apparently massive slag dumping. Smaller inclusions consist of a variety of metallic and oxidized materials; these are few in number and small (approx. 1-2 cu. ft.) in volume.

The majority of fill material appears to consist of black sand which does not appear to be related to soils native to the area. It is possible that this material is discarded casting sand from the foundry operations.

Horizontal distribution of total Pb values is also inconsistent and generally too low for consideration as a Pb resource. Very localized surface deposits of fine, grey material yielded the highest Pb values, but are of minor consequence relative to overall fill volume. The only samples yielding Pb values of over 1% were strictly surface samples.

For both Pb resource evaluation and for later comparison to EP TOX values relating to environmental considerations, Total As was run on samples, as well. Although consistently low and in acceptable ranges if the fill material were to be processed for Pb, the lack of Pb value would seem to make the As data moot, as regards the resource evaluation.

Based on the analytical and field observation data, it would appear that the fill materials bounded by Proctor Street to the east and TP-15, TP-16 and TP-17 to the north are of generally low grade and insufficient in homogeniety and volume for the site to be considered a potential resource area.

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Emergency Telephone Numbers

RESOURCE EVALUATION PAGE ELEVEN

INTRODUCTION

The preliminary tests conducted by the EPA indicate that some elevated levels for base neutral compounds and metals may be present. Based on this data, an upgraded version of "Level D" protection is recommended, a hard hat with face shield, chemical resistant boots and outerwear are recommended as personal clothing. In addition, respirators and cartridges for acid vapors, organic vapors, and pesticides are to be on the site.

While excavating, the site must be controlled to reduce the possiblity of (1) personal exposure to contaminations and (2) transport of contaminants by personnel and equipment from the site. This was implemented by establishing three work zones (exclusion zone, contamination reduction zone, and support zone). This is explained in more detail in the "Safety Procedure" section.

The next four sections are composed of lists to facilitate the ease of retrieving information during the preparation phase and field sampling.

STANDARD SAFETY PRECAUTION

- 1) Do not wear contact lenses in the field
- 2) No eating, drinking, chewing gum or tobacco, or smoking
- 3) After leaving site, the entire body should be thoroughly washed as soon as possible after protection garments are removed
- 4) No excessive facial hair which may interfere with a respirator seal
- 5) Contact with contaminated material should be avoided whenever possible. Do not walk through puddles, mud, and other discolored surfaces; kneel on ground, lean, sit, or place equipment on drums, containers, or vehicles found at the site
- 6) Approach site from up-wind direction

RESOURCE EVALUATION PAGE TWELEVE

PERSONAL PROTECTION EQUIPMENT

Coveralls - chemical resistant (pants and coat)

Gloves - chemical resistant

Boots - chemical resistant, steel toe and shank, cleated

Hard hat - face shield

Particle mask

SAFETY EQUIPMENT

- 1) First aid kit, blanket
- Eyewash
- 3) Respirators (2) with cartridge (acid vapors, organic solvent, pesticide)
- 4) Minimum of five gallons of water in jerry can for emergency washes
- 5) Someone on site at all times with CPR certification

DECONTAMINATION EQUIPMENT

(6) long-handle soft-bristle brushes

Detergent (Biodegradable)

Rinse water (in buckets)

(2) trash cans with plastic bag liners (for outerwear that cannot be decontaminated and another can for non-contaminated material, i.e., paper towels, etc)

Paper or cloth towels for drying protective clothing

Galvanized wash tub to hold spent rinse water

Supply of large plastic garbage bags (required at Site 1 and Site 2 in contamination reduction zone)

RESOURCE EVALUATION PAGE THIRTEEN

SAFETY PROCEDURE

The approach to the site should always be from the up-wind direction. During the excavation process, if the digging results in the release of a cloud of vapors, the site should be evacuated and personnel should leave the site for a safe area. In addition, the fire department should be notified. At least three people should be on the site during work periods with one person remaining in the support zone ready to respond to accidents or emergencies. This person will also help during the decontamination process.

A. Description of Zones.

Exclusion Zone is the innermost area of three concentric areas. At both sites, it is the area where the fill material is located. The exclusion zone should be entered at one designated site and exited from another designated site so that cross contamination of zones is reduced. Personnel in this area must be in full protective clothing.

<u>Support Zone</u> is the outermost part of the site and is considered clean. Support equipment (command post and equipment truck) is located in this zone.

The equipment truck and command post should be sited in the support zone so they are upwind of the exclusion zone. The exact location of the equipment truck will have to be determined each day based on the wind and weather conditions.

Equipment (excavating and protective clothing) that has been used in the exclusion zone must be decontaminated the contamination reduction zone before it re-enters the support zone.

Contamination Reduction-Zone is between the exclusion zone and the support zone. This area serves as a buffer to reduce the probability of contaminating the support zone. Personnel entering the contamination reduction zone from the support zone should be wearing full protective clothing.

RESOURCE EVALUATION PAGE FOURTEEN

Two decontamination sites will be established in the contamination reduction zone. Site 1 will be at the interface with the exclusion zone. The first decontamination rinse will take place on site. After all personnel and equipment are finished with decontamination site 1, they proceed to site 2. The second site will be closer to the interface with the support zone. At site 2 the second rinse will be performed and the protective clothing removed.

B. Decontamination Process

Site 1

Protective clothing (Still being worn) will be cleaned with a detergent-water solution and scrub brushes. The rinse water will be collected in galvanized wash tubs.

The machinery will be hosed off with water (if possible, under pressure)

Site 2

The procedure listed above is repeated

If protective clothing cannot be cleaned it will be placed in a plastic-lined trash can and properly disposed of at the end of the project

After the second rinse, the protective clothing should be dried and removed before entering the support zone

The third person in the support zone will don protective clothing and assist with the decontamination process. Before this person leaves the contamination reduction zone and enters the support zone, the outerwear clothing will be rinsed and wiped dry.

During the decontamination process all personnel and equipment leaving the exclusion zone will proceed as a unit from site 1 to site 2.

At the end of each day, the equipment (including outerwear clothing) will be placed in separate plastic bags before being loaded into the truck. This should reduce cross-contamination and reduce the chance of contaminating the truck. At the start of each day, the equipment will be removed from the bags and the bags will be discarded.

RESOURCE EVALUATION PAGE FIVETEEN

C. Decontamination During a Medical Emergency

If the injury is minor, the standard decontamination procedures should be followed before medical treatment is administered (at the site or at a medical facility). Lifesaving care should always be instituted immediately without considering decontamination. If the chemical contaminant is inhaled, medical treatment by a physician is required. If the contaminant is on the skin or in the eyes, the area should be flooded with water immediately after contact and treatment administered at a medical facility.

APPENDIX I

Hospital - Anderson Site

NAME:

Tacoma General

ADDRESS:

315 South K Street Tacoma, Washington

TELEPHONE:

594-1100

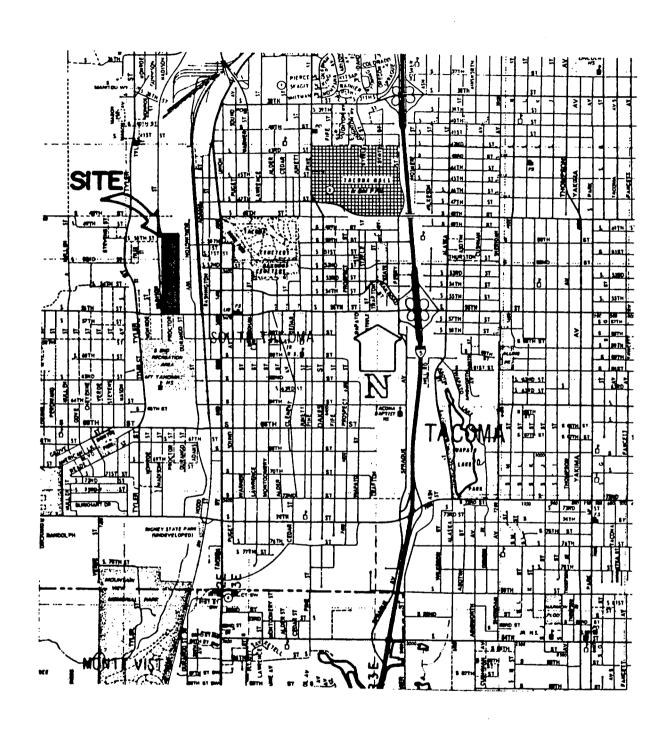
TRAVEL TIME:

15 minutes

DIRECTION:

I-5 north to Sprague Exit, Sprague north to Division, Division to South K to

hospital

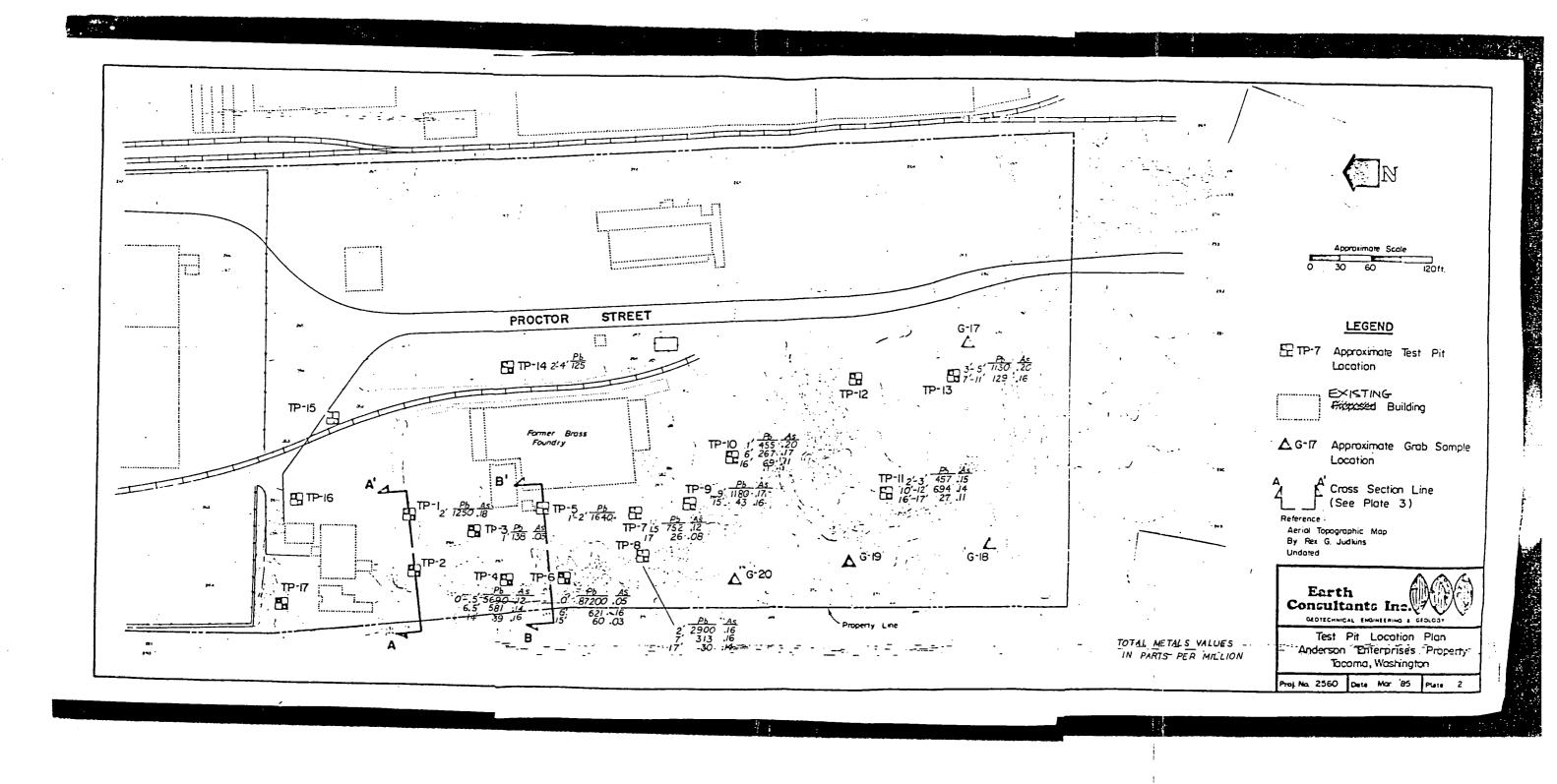


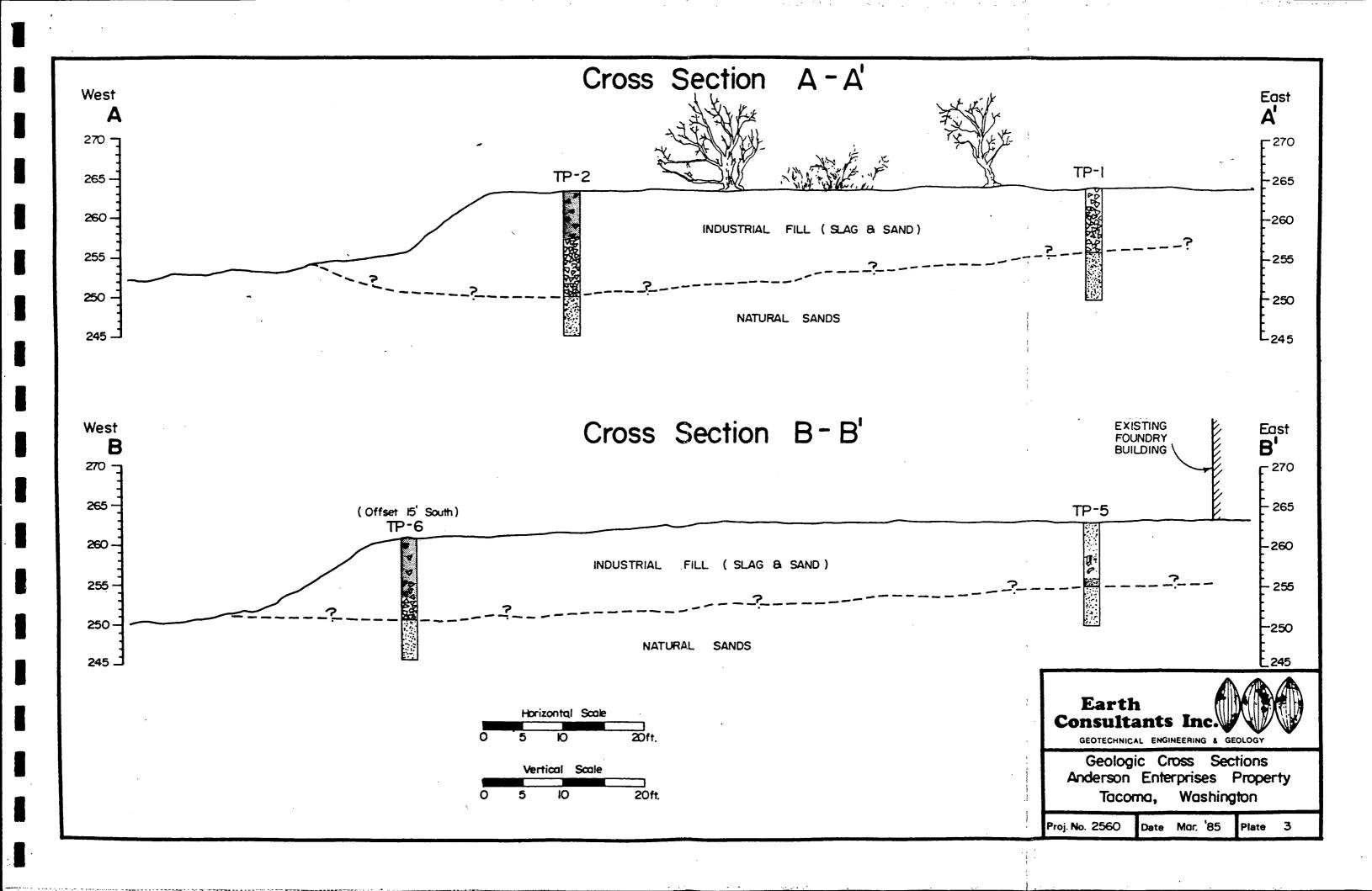


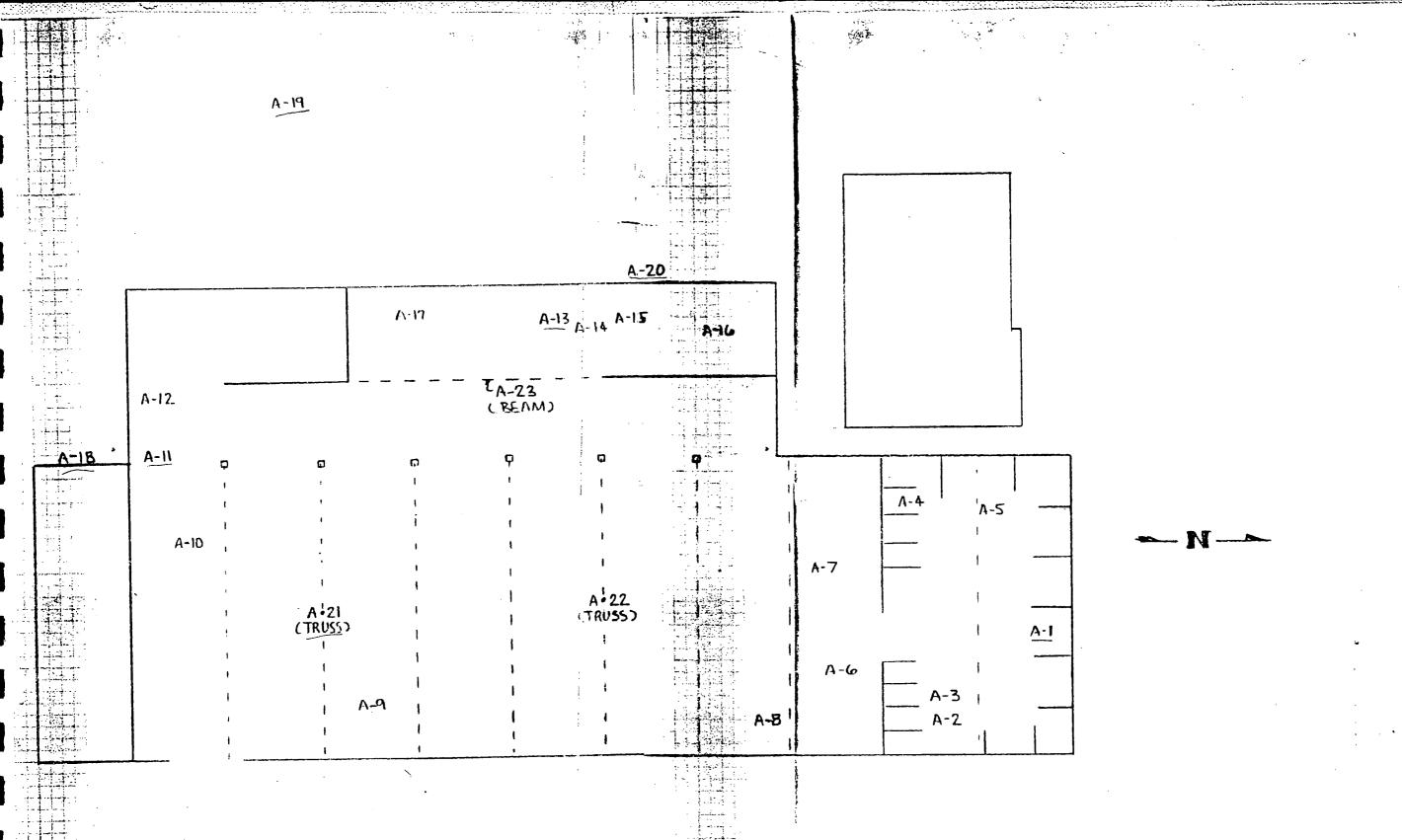
Vicinity Map
Anderson Enterprises Property
Tacoma, Washington

Proj. No. 2560

Date Mor. 85







APPROX. SAMPLE LOCATIONS.
TACOMA INDUSTRIAL PROPERTIES
TC-86-8380

MAJ	OR DIVISIO	NS	GRAPH LETTER SYMBOL		TYPICAL DESCRIPTION
	Gravel			GW gw	Well-Graded Gravels, Gravel-Sand Motures Little Or No Fines
Coarse	And Gravelly Soils	Clean Gravetti (little or no time)	• • •	GP gp	Przery: Graded Gravels, Gravels Sacer Motores, Little Or No Fines
Grained Soils	More Than 50% Coarse	Gravels With		GM gm	Sity Gravets Gravet-Sand- Sitt Mixtures
	Fraction Retained On No. 4. Sieve	Fines (appreciable amount of fines.)		GC gc	Clayey Gravels Gravel - Sand - Clay Mixtures
	Sand	Clean Sand		SW sw	Well-Graded Sands, Gravelly Sands, Little Or No Fines
More Than	And Sandy Soils	(little or no lines)		SP sp	Poorly-Graded Sands, Gravelly Sands Little Or No Fines
50% Material Larger Than No 200 Sieve	More Than 50% Coarse Fraction Passing No. 4 Sieve	Sands With		SM sm	Silty Sands, Sand - Silt Mixtures
Size		Fraction F	Fines (appreciable amount of fines)		SC sc
		dieve		ML ml	Inorganic Silts & Very Fine Sands, Rock Flour, Silty Clayey Fine Sands; Clayey Silts w/ Slight Plasticity
Fine Grained	Sills And	And Less Than 50		CL cl	Inorganic Clays Of Low To Medium Plasticity. Gravelly Clays, Sandy Clays, Silty Clays, Lean
Soils	Clays			OL ol	Organic Silts And Organic Silty Clays Of Low Plasficity
More Than		Silts Liquid Limit And Greater Than 50		MH mh	Inorganic Sills, Micaceous Or Diatomaceous Fine Sand Or Silly Soils
50%, Material Smaller Than No 200 Sieve Size	And		9///	CH ch	Inorganic Clays Of High Plasticity Fat Clays
	Clays			OH oh	Organic Clays Of Medium To High Plasticity: Organic Silts
	Highly Organic Soils			PT pt	Peat Humus, Swamp Soils With High Organic Contents

1	Topsoil	Humus And Duft Layer
	Fill	Highly Variable Constituents

The Discussion in The Text Of This Report is Necessary For A Proper Understanding Of The Nature Of The Material Presented in The Attached Logs

Notes:

Dual symbols are used to indicate borderline soil classification. Upper case letter symbols designate sample classifications based upon laboratory testing; lower case letter symbols designate classifications not verified by laboratory testing.

2"O.D. SPLIT SPOON SAMPLER 24" I D. RING SAMPLER OR SHELBY TUBE SAMPLER ${
m I\hspace{-.1em}I}$ SAMPLER PUSHED * SAMPLE NOT RECOVERED

▼ WATER LEVEL (DATE)

WATER OBSERVATION WELL

C TORVANE READING, tsf

QU PENETROMETER READING, tsf

W MOISTURE, percent of dry weight

pcf DRY DENSITY, pounds per cubic ft.

LL LIQUID LIMIT, percent

PI PLASTIC INDEX

Consultants Inc. GEOTECHNICAL ENGINEERING & GEOLOGY LEGEND

Date Mar. '85 Proj. No. 2560

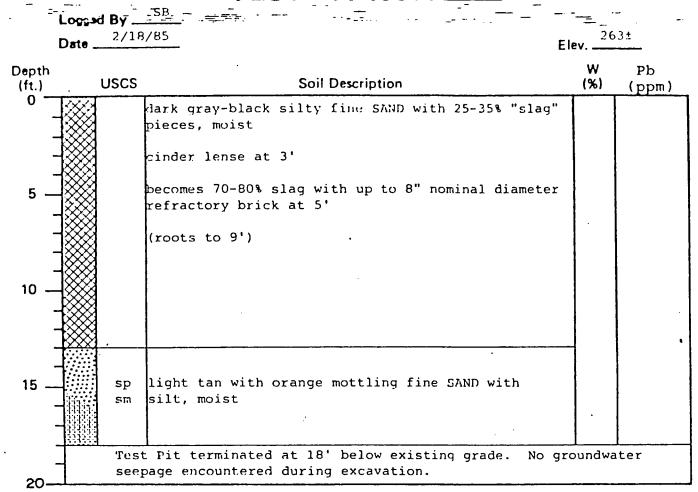
Locaed By __SR Date _____2/18/85 Elev. 264± Depth W Pb **USCS** (ft.) Soil Description (%) (ppm) 0 angular slag up to 18" nominal diameter, insignificant fines 1250 @5-6' apparent "welded" zone-perhaps placed hot and molten sp light brown SAND with silt 10 (no apparent dip to strata) becomes tan with light brown mottling Test Pit terminated at 14' below existing grade. No groundwater 15 seepage encountered during excavation. 20-

____TEST PITLOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85



Earth
Consultants Inc.

TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85

Loca	2719	B	20	64±
Date	. 2719.		W (%)	Pb (ppm)
ipth ft.)	USCS	Soil Description	1001	138
0' - 1 22	a T	brown silty SAND with roots		130
1/2	3587	black-dark gray metallic luster "SAND" grain Size		1
1 %	X	cinder layer with refactory bricks (roots to 3')		
5 —		dark brown to black silty SAND with 50-60% slag pieces ranging from 2-3" up to 6" nominal diameter		
- 123	∅		1	
		2-3" angular slag with little to no fines		
10	20°			
	sp	light brown SAND, fine with silt		
-	sm	becomes tan with brown mottling		
15	Te: No	st Pit terminated at 14.5' below existing grade. groundwater seepage encountered during excavation.		
4				
4				
20_7				

TEST PIT LOGS

-ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. 185

Plate

7

Consultants Inc.

TEST PIT NO. _4_

L	occed By S	B	v26	<u> 21</u>
Depth (ft.)	USCS	Soil Description	W (%)	Pb (ppm)
0]	××	light brown silty gravelly SAND with lumber debris		5690
5 —		black with some iron staining, silty SAND with 40-50 slag exhibiting some cementation and minor scrap metal, zones of increasing % slag to 70% @ 1.5-3' and 6-7.5'	ર	3530
		minor isolated zone of FeO staining @ 18°↓W		581
10 — -		(roots to 9.5') black "slag" up to 18" nominal diameter with little or no fines		
15 —	 	black silty SAND with trace small slag fragments tan with orange mottling SAND, fine with silt, moist		39 .
_		decreased mottling	<u> </u>	<u> </u>
	Tes see	t Pit terminated at 18' below existing grade. No grage encountered during excavation.	coundw	ater

TEST PIT LOGS

ANDERSON_ENTERPRISES PROPERTY -- TACOMA, WASHINGTON

Consultants Inc.

Proj. No. 2560

Date Mar. '85

Plate

8

pth ft.)	USCS	Soil Description	W (%)	Pb (ppm)
° – 8	30°_	dark brown SAND with silt, 30-40% slag, wood fragments, gravel		1640
		scattered refractory bricks @ 3-4' predominately and isolated to 7'		
5	10°	slag-angular ranging to 8" nominal diameter, some dark brown sandy lenses comprising < 15% by weight, some copper stained pieces-isolated black SAND with silt < 5% slag		
10 —	sp sm	light brown SAND with silt becomes tan at 9.5'		

TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY
TACOMA, WASHINGTON

Consultants Inc.

Proj. No. 2560

Date Mar. '85

Plate

q

epth ft.)	USCS	Soil Description	W (%)	Pb (ppm)
Б —	20°	dark gray silty SAND with < 10% slag, moist dark brown/black silty SAND with 40-50% slag, moist, exhibiting slight to medium cementation slag up to 20" nominal diameter scattered refractory brick from 6-7' 90% slag with fines comprised of slag debris		87,200 621
5	Tes see	decreased mottling at 13' t Pit terminated at 15' below existing grade. No page encountered during excavation.	groundw	60 ater

37200 100000 = 3.7%



TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85

TEST PIT NO. _7_

2/19/85 Date . Pb W Depth (%) **USCS** Soil Description (ppm) (ft.) black iron-stained SAND with 60-70% slag (partially welded), with isolated brick fragments 752 20 black silty SAND very hard layer 25° (minor steel cuttings) black iron-stained slag (85-90%), with black sand, isolated brick fragments and cinder lenses lense of black_SAND with 5-60% slag black glassy slag up to 18" nominal diameter, some 10 olive coloration, little or no fines 10° light brown SAND with silt, becomes light tan sp 15 with slight mottling 26 Test Pit terminated at 17.5' below existing grade. No groundwater seepage encountered during excavation.

Earth
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GEOTECHNICAL ENGINEERING & GEOLOGY

TEST PIT LOGS

-- ANDERSON-ENTERPRISES_PROPERTY
--- TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85

W Pb Depth **USCS** Soil Description (%) (ft.) (ppm) 0 black iron-stained coarse SAND, moist, isolated lumber debris with 40-50% slag 2900 313 20°_ scattered refractory bricks at 8-9' black slag with little or no fine matrix, slag 10 sizes range to 18" nominal diameter tan/light brown mottled SAND, fine with silt, sp moist 15 -នធា becomes light tan in color and decreased mottling 30 Test Pit terminated at 18' below existing grade. No groundwater seepage encountered during excavation. 20.

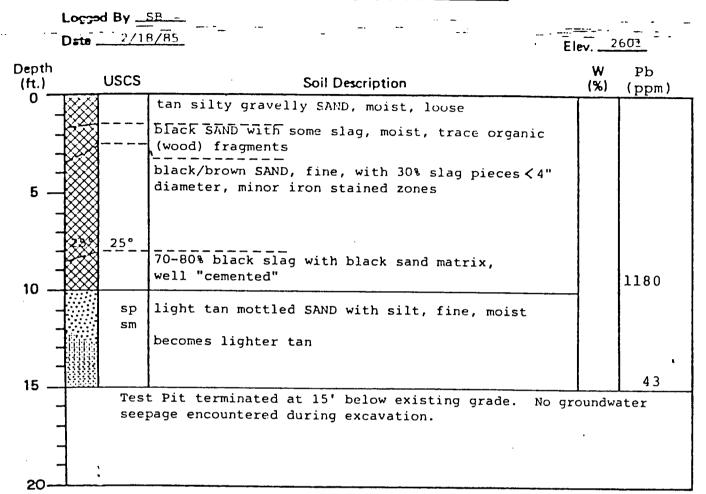
Earth
Consultants Inc.

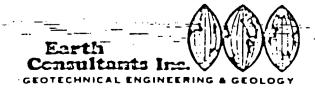
TEST PIT LOGS

=ANDERSON ENTERPRISES PROPERTY
- TACOMA, WASHINGTON

Proj. No. 2560 D

Date Mar. '85





TEST PIT LOGS

TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85

- Logged By __SB Date ___2/18/85 Depth Pb **USCS** (ft.) Soil Description (%) (ppm) 0 dark brown iron stained silty SAND with 35-40% 455 slag/gravel ____ predominately slag up to 12" diameter with little or no fines 267 dark gray/black SAND with silt and 15-20% slag 5 slag increases to 70-75% with some fine matrix 10 light brown SAND with silt, moist sp sm becomes tan 15 69 Test Pit terminated at 15' below existing grade. No groundwater seepage encountered during excavation.

TEST PIT LOGS

ANDERSON ENTERPRISES -PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85

	Date2/19	HETT 그렇게 하는 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그 그	v. <u>2</u>	63 <u>±</u>
epth (ft.)	USCS	Soil Description	W (%)	Pb (ppm)
	30°	dark brown gravelly silty SAND, fine with scattered organics black silty SAND with 70-80% slag up to 18" diameter, and bricks		457
5 -	25°	dark brown/black silty SAND with 40% slag up to 4" and scattered refractory brick		504
10 -	10°	becomes more black in color, isolated branches		694
5 .	sp 	light brown SAND with silt, moist becomes tan with minor light brown mottling		27
	Tes	t Pit terminated at 17' below existing grade. No grage encountered during excavation.	cound	water

Earth
Consultants Inc.
SECTECHNICAL ENGINEERING & GEOLOGY

TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY_
TACOMA, WASHINGTON

Proj. No. 2560

Data Mar. 85

Piate 15

Logged By __SB_ 2/19/85 Depth W ·Pb **USCS** (ft.) Soil Description (%) 0 (ppm) brown iron stained SAND with silt, 40-50% slag and scattered refractory bricks 30° black SAND, fine to medium, with metallic luster, 10-15% slag < 4" nominal diameter brown iron stained SAND with 60-70% slag up to 12" nominal diameter 30° light brown iron stained gravelly SAND with silt, scattered refractory bricks, slag, scrap iron 10 light brown SAND with silt, becomes tan at 14.5' sp 15 becomes tan sandy GRAVEL Test Pit terminated at 17' below existing grade. No groundwater seepage encountered during excavation. 20

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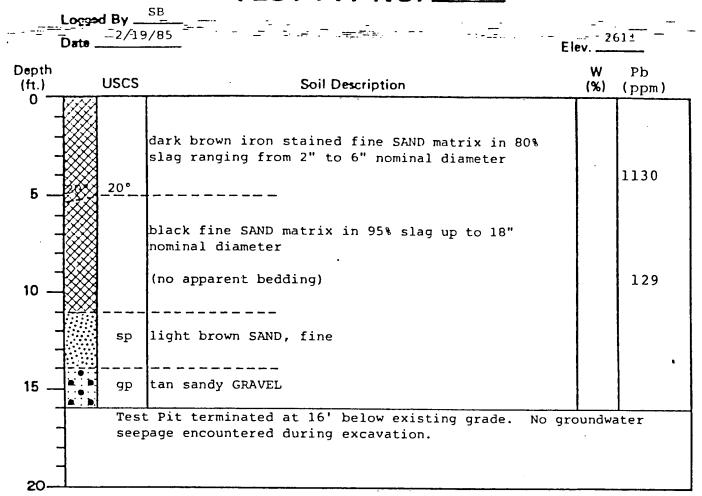
GEOTECHNICAL ENGINEERING & GEOLOGY

TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85



TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY
TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85

Plate 17

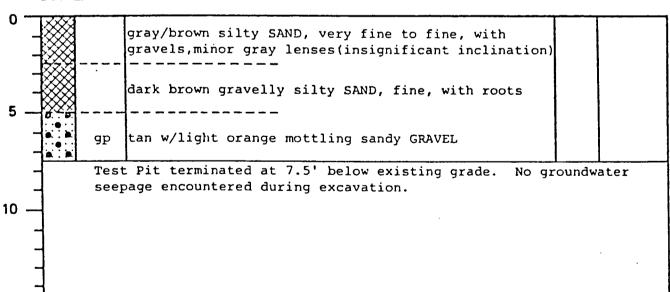
Consultants Inc.

Logged By __SB Date ____2/19/85 Depth **USCS** (ft.) Soil Description (%) (ppm) 0 dark brown/black gravelly SAND with 15-20% slag, moist gray silty SAND with 30-40% slag, red building 125 bricks, concrete footing pad (flat lying contact) dark brown silty gravelly SAND, fine (may be original topsoil?) tan/orange mottled sandy GRAVEL, fine to medium gр becomes grayish at 9' 10 Test Pit terminated at 11' below existing grade. No groundwater seepage encountered during excavation. 15

Logged By __SB___ Date __2/20/85__

TEST PIT NO. 15

Elev. __262±



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TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY --TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85

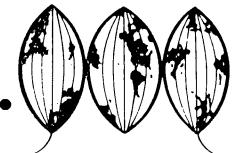
APPENDIX M

SOIL SAMPLING AND CHEMICAL TESTING ANDERSON ENTERPRISES PROPERTY - 1985

SOIL SAMPLING & CHEMICAL TESTING
ANDERSON ENTERPRISES PROPERTY
TACOMA, WASHINGTON
E-2560

THOMAS R. ANDERSON, PRESIDENT

Earth Consultants Inc.



Géotechnical Engineering and Geology

September 16. 1985

E-2560

Thomas R. Anderson, President Anderson Enterprises, Inc. 1123 Port of Tacoma Road Tacoma, Washington 98421

Subject:

Report

Soil Sampling and Chemical Testing

Anderson Enterprises Property

Tacoma, Washington

Dear Mr. Anderson.

Transmitted herewith is our report of Soil Sampling and Chemical Analyses for the parcel of property located in South Tacoma, north of South 56th Street and east of Madison Street. This report has been prepared in association with Bennett Laboratories, Incorporated of Tacoma, Washington, to summarize the findings of recent test pit excavations and chemical analyses of representative samples taken from the site fill and native soils.

Should you have questions concerning this report, feel free to contact us. Earth Consultants, Inc. is available to discuss our findings at your convenience.

Respectfully submitted,

EARTH CONSULTANTS, INC.

John J. Moran, P.E. Project Manager

JJM/tm

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PΙ	Α	T	E	S
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Legend			Plate 4
Test Pit	Logs	Plates 5	through 30

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TABLE I: Test Pit Data Compilation

TABLE II: EP Toxicity Analyses of Test Pits at Various Depths

TABLE III: EP Toxicity Summary of Chemical Analyses

INTRODUCTION

On February 6, 1985, Earth Consultants, Inc. in association with Bennett Laboratories of Tacoma, Washington, was authorized to proceed with a sampling and chemical testing program of soils and industrial fill materials found on the Anderson Enterprises property in Tacoma, Washington. The site is located on Proctor Street, north of South 56th Street. This report documents the results of chemical analyses along with the methods employed to perform the various technical tasks.

SCOPE OF WORK

Activities performed for the evaluation of soils at this site consist of:

- .. A review of historical data to establish previous uses of the property.
- .. Observations of site conditions to plan efficient sampling methods.
- .. A review of existing chemical and hydrologic data for the site.
- .. Development and implementation of a site safety plan for the anticipated physical and chemical conditions.
- .. Obtaining, preserving and transporting soil samples to the chemical laboratory.
- .. Chemical analyses for lead, arsenic, six additional heavy metal elements, halogenated hydrocarbons and polycyclic aromatic hydrocarbons.

.. Review and compilation of test results and preparation of this summary report.

STUDY METHODOLOGY

Pre-Sampling Activities

On February 14, 1985, a tour of the site was made by representatives of Anderson Enterprises, Inc., Bennett Laboratories, Inc. and Earth Consultants, Inc. The surficial distribution of fill materials and location of structures were observed to develop an efficient sampling program. Obstructions to the proposed sampling activities, such as adverse terrain or buried utility facilities, were also noted.

The primary purpose of this study was to examine surficial fill materials overlaying natural soils on the site. Observations, experience and previous near site studies indicated that the fill was composed of industrial wastes, including casting sand, slag and brick with lesser quantities of other inorganic and organic debris. Due to this origin and to distinguish it from natural earth fills, this material is described as "industrial Generally, industrial fills are relatively shallow in depth and heterogeneous in composition and placement. excavated test pits were selected as the principal exploration technique for the ability to expose relatively large pit wall areas for observation and to allow discrete sampling of specific fill materials.

Sampling locations were selected on the basis of the site observations and historical records of previous site Prominent physical features such as mounds, ditches and surface designated discolorations were for test pit excavation, accessible within the property boundaries. Test pits were also placed adjacent to the western edge of the filled area and at

other selected locations to delineate the extent and depth of industrial fill material, as well as its chemical and physical characteristics. Inaccessible areas of interest on the property, including locations within or between structures, were sampled by manual methods using standard hand tools (i.e. "grab" samples). Grab samples were also designated near the southwest property corner, representing the only exposed area of natural or non-fill soils on the site.

A site safety plan was developed for this project. Criteria for the safety plan and designation of personal equipment were after reviewing đata from preliminary analyses by Bennett Laboratories and similar results compiled for the South Tacoma Swamp study by the U.S. Environmental Protection Agency. Considerations included metals with possible PAH concentrations at some locations.

Sampling Activities

Sampling and test pit locations were mapped by compass direction and tape distance to existing structural features including buildings and fencelines.

The Continental Dirt Company of Kent, Washington, was retained to perform the excavations. Equipment employed for the excavation consisted of a track-mounted Hitachi Model T1720261 backhoe with a reach-capability of twenty two (22) feet and a fifty six (56) inch bucket width.

Each test pit was excavated through the industrial fill materials and into the natural earth soils. After excavation, a detailed log was prepared of the exposed test pit wall. Significant features, including soil types, lithologic contacts, cultural debris and sample locations were noted on the log form.

Ground level adjacent to each test pit was used as vertical control reference with depth measurements provided by hand tape.

Test pit walls and individual samples were visually examined to select those areas suspected of the highest levels of lead, arsenic, polycyclic aromatic hydrocarbons (PAH), and/or halogenated hydrocarbons (HH). Surface and subsurface samples were obtained to characterize materials representative of the test pits and discolored localized surficial materials.

Samples taken from the test pits and grab samples were placed in glass furnished jars by Bennett Laboratories. containers consisted of one quart glass jars washed with dilute nitric acid, rinsed with deionized water, followed by a methylene chloride rinse and then allowed to air dry. Some grab samples having only visual inspection interest were placed in zip-lock bags. Each jar was clearly labeled as to test pit number, sample number, geologist, site name and date. The sample jars were then placed in ice-packed chests at the site and transferred to the laboratory daily during the sampling program.

Chemical Analysis

Results of the chemical analyses are presented on Tables I, II and III. In addition, lead concentrations are shown on the test pit logs, Plates 5 through 30, to provide a direct comparison with depth and physical characterization.

Analytical parameters were selected on the basis of historical data regarding past site activities, data reported in the Black and Veatch study of the South Tacoma Swamp and observed surface characteristics.

Analytical methods were performed in conformance with WDOE 83-13, Chemical Testing Methods, as provided for by WDOE 173-303. for metals were performed atomic by absorption spectrophotometer after a twenty four (24) hour extraction period in 0.5 normal acetic acid as specified by the EP Toxicity methodology. Minimum detection limits for lead and arsenic are parts per million (ppm). Organic analyses conformed to methods designated in WDOE 83-13 utilizing procedures cited in EPA SW 846 method 8120 for Halogenated Hydrocarbon and Polycyclic Aromatic Hydrocarbons. Detection limits for the organic analyses are 0.01 mg/g (10 ppm).

RESULTS OF STUDY

Topographic and Cultural Features

The Test Pit Location Plan, Plate 2, illustrates the position of test pits and surface sampling locations for this study. Most surface within the boundaries of the study area relatively flat and level. In the southern one-third of the topographic property, the dominant feature consists irregular north-south trending slope formed by coalescing lobes of industrial fill placed over native sands and gravels. separates the elevated plateau to the east which supports the existing foundry building from lowlands to the west. The toe of the slope marks the maximum western extent of industrial fill materials encountered in the test pits.

The central one-third of the site is occupied by a large building which formerly housed a foundry with attendant machine shops and cleaning rooms. To the west of the foundry building lies a paved parking area underlain by as much as thirteen (13) feet of slag, refractory bricks, metal fragments and other cultural debris.

Distribution of Industrial Fill

The Test Pit Data Compilation, Table I provides a tabular summary of fill thickness at the sampling locations. Within the study area, the thickness of fill ranged from one to thirteen and one-half (13.5) feet with an average thickness of approximately eight feet. The Test Pit Logs, Plates 5 through 30, present a summary of materials encountered in each excavation along with details regarding moisture, bedding and other physical features. Native soil contacts were readily recognized by their tan/brown mottled appearance, as opposed to the black sandy material with inclusions that were the predominant characteristics of the fill.

The stratigraphic section exposed in the test pit walls appeared consistent with a scenario of successive depositions of fill material. The inclination of fill strata varied from near horizontal to about 20 or 30 degrees downward towards the outer extremities of filled areas. Inclusions found throughout the fill contained refractory brick, metal turnings and fragments, slag, oxidized precipitates and other assorted cultural debris.

The industrial fill is characterized as dark brown to black silty fine sand with an angular slag component. This matrix material appears to be siliceous and may have originated as casting sand prior to being discarded as fill. Slag appears throughout the fill materials in forms ranging from finely divided fragments to pieces approximately eighteen (18) inches across. Refractory brick occurrences are less concentrated and widely scattered throughout the fill. Inclusions containing materials other than slag and refractory brick appear to be widely and irregularly scattered and average from 1 to 3 cubic feet in volume.

Interior Facilities Inspection

In addition to sampling test pit excavations, inspections were made of the former foundry building, coke storage buildings concrete oil house structure. A blueprint for the Griffin Wheel Company, dated January 15, 1925, provided information as to the uses for various parts of the facility. Excepting the coke storage building, all interior rooms had concrete floors which appeared to be sound and free of defects which could permit seepage of fluids or chemicals used during foundry operation. Several small diameter sumps were located in the floors of some buildings; the continuity of plumbing for these sumps was not ascertained during the course of this preliminary study.

The coke building, immediately north of the main foundry building, was dry and covered. A concrete floor slab existed throughout the structure except in one room near the south entrance. A near surface grab sample, G-23A, was obtained from the earth floor of this room.

A visual inspection of a small concrete structure labeled as "Oil House" (see Plate 2) located adjacent to the western property line in the central portion of the property revealed that the building was empty and dry. The interior was viewed through an access port in the roof as the door entrance, facing east towards the foundry building, was entirely blocked by fill.

Groundwater

No groundwater was encountered in any of the shallow test pits excavated as part of this current study. Earlier studies performed in the site area (Black and Veatch, 1983), suggest that the water table may be encountered about thirty five (35) feet beneath the ground surface, and that the direction of groundwater flow is from the southeast toward the northwest.

Analytical Results

Earlier sampling studies (Black and Veatch, 1983) had reported elevated concentrations of lead in some surface samples from the southern one-third of this site. Accordingly, lead parameter of primary interest for this current study. Arsenic was analyzed because of its common association with lead and frequency of occurrence in this geographical area. Options for testing other heavy metals were exercised selectively. arsenic concentrations for each tested sample are shown on the Test Pit Location Plan, Plate 2, relative to sample depths. presentation provides a useful, quick overview of the distribution of these parameters across the site. Additional detail for lead, arsenic, metals and organic compounds is presented in Tables II and III and on the individual test pit logs.

The laboratory data presented in Table II, indicates that only one sample, taken from the upper one foot in Test Pit TP-6, contained lead above the maximum concentration level (MCL) of 5 ppm which serves as the lower bounds for designation as dangerous waste in accordance with WDOE Dangerous Waste Regulations, Chapter At this location, the lead concentration drops 173-303-090 WAC. to 0.6 ppm at a depth of three feet and in native soils below the fill, the lead concentration is 0.1 to 0.4 ppm, or essentially levels. This data indicates that fill background containing lead in concentrations above 5 ppm do not extend more than three feet below the surface, and are generally confined to an area immediately surrounding Test Pit TP-6.

earlier study by Black and Veatch, 1983 also found The positive indications of organic compounds in surface Sampling locations for this current subsurface soil samples. study were selected on the basis of historical documents, evidence of recent site usage and observations of surficial conditions.

Test methods for oil and grease, polycyclic aromatic hydrocarbons (PAH), and halogenated hydrocarbons (HH) were selected as screening procedures for the types of organic compounds reasonably expected to occur on the site fills and soils. Analytical data developed for this current study, as shown on Table III, found no detectable concentration of either PAH or HH and only relatively low concentrations of oil and grease.

We trust this information is adequate for your current needs. If you have any questions or if we may be of further service, please do not hesitate to contact us.

Respectfully submitted,

EARTH CONSULTANTS, INC.

Don W. Spencer

Project Manager/Project Geologist

Sencer

Robert S. Levinson, P.E.

President

BENNETT LABORATORIES

M. E. Lough

DWS/JJM/RSL/tm President

REFERENCES

Black and Veatch, June 1983, Preliminary Site Investigation, South Tacoma Swamp, Tacoma, Washington, USEPA Contract Number 68-03-1614, work assignment Z-3-6, 93 pages.

Walters, K. L., Kimmel, Grant E., 1968, Groundwater Occurrence and Stratigraphy of Unconsolidated Deposits, Central Pierce County, Washington: Water Supply Bulletin No. 22 Washington Department of Natural Resources.

TABLE I
TEST PIT DATA COMPILATION

Test Pit Number	Total Test Pit Depth (Ft.)	Thickness of Fill (Ft.)	Maximum Lead Concentration (PPM)
1	14.0	8.0	N/D
2	18.0	13.0	<.1
3	14.5	10.0	<.1
4	18.0	13.5	2.8
5	13.0	8.0	<.1
6 ·	15.0	10.0	580.0
7	17.5	13.5	<.1
8	18.0	13.0	<.1
9	15.0	10.0	<.1
10	15.0	11.0	<.1
11	17.0	13.0	<.1
12	17.0	13.0	N/D
13	16.0	11.0	.4
14	11.0	7.0	•5
15	7.5	5.0	N/D
16	10.0	8.0	•2
17	6.0	2.0	<.1
18	10.0	6.5	N/D
. 19	10.0	4.5	•2

TABLE I (cont.)

TEST PIT DATA COMPILATION

Test Pit Number	Total Test Pit Depth (Ft.)	Thickness of Fill (Ft.)	Maximum Lead Concentration (PPM)
20	9.0	5.0	N/D
21	8.5	5.5	<.1
22	12.5	8.5	<.1
22A	10.0	6.0	<.1
24	8.0	3.0	N/D
24A	8.0	2.0	<.1
25 ·	15.0	10.0	<.1
26	17.0	12.0	.3
28	7.0	1.0	.1
29	18.0	13.0	<.1
30	8.0	3.0	.4
31	8.0	4.0	<.1
32	6.5	3.5	<.1
33	13.0	9.0	<.1
G18	GRAB	all to the con-	.4
G21A	GRAB	alle can quickle	<.1
G23	GRAB		۲.1
G23A	GRAB		<.1

TABLE II

EP TOXICITY ANALYSES OF TEST PITS AT VARIOUS DEPTHS

Test Pit	Depth Interval	Pb ppm	As ppm	Hg ppm	Cd ppm	Cr ppm	Ag ppm	Ba ppm	Se ppm
TP-2,	1' - 2'	<.1	<.1						
TP-2,	18'	<.1	<.1						
TP-3,	1'	<.1	<.1						
TP-3,	14'	<.1	<.1	٠					
TP-4,	0'5'	•3	<.1						
TP-4,	2.5'	2.8	<.1	<.01	.01	.25	<.01	<1	<.1
TP-4,	6.5'	•2	<.1	•					
TP-4,	11' - 13'	•3	<.1						
TP-4,	14'	<.1	<.1	<.01	<.01	.02	<.01	<1	<.1
TP-5,	1' - 2'	.4	<.1						
TP-5,	12' - 13'	<.1	<.1						
TP-6,	05	580	<.1	<.1	•01	.03	<.01	<1	<.1
TP-6,	31	.6	<.1						
TP-6,	6'	.1	<.1						
TP-6,	10.5'	.4	<.1						
TP-6,	15'	.1	<.1	<.01	<.01	.01	<.01	<1	<.01
TP-7,	1.5'	<.1	<.1						
TP-7,	17'	<.1	<.1						
TP-8,	2'	<.1	<.1						
TP-8,	7'	<.1	<.1						
TP-8,	17'	<.1	<.1						
TP-9,	2'	<.1	<.1						

TABLE II (cont.)

EP TOXICITY ANALYSES OF TEST PITS AT VARIOUS DEPTHS

Test Pit	Depth Interval	Pb ppm	As ppm	Hg ppm	ppm Cd	Cr ppm	ppm Ag	Ba ppm	Se ppm
TP-9,	9'	<.1	<.1						
TP-9,	15 '	<.1	<.1	<.01	<.01	<.01	<.01	<1	<.1
TP-10	, 1'	.4	<.1						
TP-10	, 6'	<.1	<.1	•				144	
TP-10	, 15'	<.1	<.1					: "	15
TP-11	, 2' - 3'	<.1	<.1	₹.01	<.01	<.01	<.01	<1	<.1
TP-11	, 10' - 12'	<.1	<.1						
TP-11	, 16' - 17'	<.1	<.1	<.01	<.01	<.01	<.01	<1	<.1
TP-13	, 3' - 5'	<.1	<.1						
TP-13	, 7' - 11'	.1	<.1						
TP-13	, 15' - 16'	.4	<.1						
TP-14	, 2' - 5'	<.1	<.1						
TP-14	, 5' - 7'	•5	<.1						
TP-14	, 9' - 10'	<.1	<.1						
TP-16	, 1' - 5'	•2	< . 1						
TP-17	, 1' - 2'	<.1	<.1	<.01	<.01	<.01	<.01	<1	<.1
TP-19	0, 0' - 1.5'	•2	<.1						
TP-19	, 8' - 9'	<.1	<.1						
TP-18	3, 0' - 2'	<.1	<.1						
TP-18	3, 1' - 1.5'	<.1	<.1						
TP-18	3, 8' - 10'	<.1	< . 1						
TP-21	1, 0' - 1'	<.1	<.1	<.01	<.01	<.01	<.01	<1	<.1

TABLE II (cont.)

EP TOXICITY ANALYSES OF TEST PITS AT VARIOUS DEPTHS

Test Pit	Depth Interval	Pb ppm	bbw ya	ррт Нд	ppm Cd	Cr ppm	Ag ppm	Ba ppm	Se ppm
TP-21,	7' - 9'	<.1	<.1						
TP-24,	0' - 1'	<.1	<,1						
TP-24,	7' - 8'	<.1	<.1						
TP-22,	10' - 12'	<.1	<.1	•					
TP-22A	4, 2' - 4'	<.1	<.1						
TP-24	A, 0' - 1'.	<.1	<.1						
TP-24A	1, 1' - 2'	<.1	<.1	•					
TP-25,	1' - 3'	<.1	<.1	<.01	<.01	<.01	<.01	<1	<.1
TP-25,	4.5' - 6'	<.1	<.1	<.01	<.01	<.01	<.01	<1	<.1
TP-25,	13' - 14'	<.1	<.1	<.01	<.01	<.01	<.01	<1	<.1
TP-26,	3' - 5'	•3	<.1						
TP-26,	16' - 17'	<.1	<.1						
TP-28,	0'5'	.1	<.1				•		
TP-28,	2' - 3'	< . 1	<.1						
TP-28	, 6' - 7'	<.1	<.1						
TP-29,	21 - 31	<.1	<.1						
TP-29,	2' - 4'	<.1	<.1						
TP-29	, 5' - 7'	<.1	<.1						
TP-29,	131,- 141	<.1	<.1						
TP-30,	, 0' - 1'	.4	<.1						
TP-30	, 7' - 8'	<.1	<.1						
TP-31,	, 0' - 1'	<.1	<.1						

TABLE II (cont.)

EP TOXICITY ANALYSES OF TEST PITS AT VARIOUS DEPTHS

	Depth Interval	Pb ppm	As ppm	ppm ppm	Cd ppm	Cr ppm	Ag ppm	Ba ppm	Se ppm
TP-31,	6' - 7'	<.1	<.1						
TP-32,	1' - 1.5'	<.1	< . 1						
TP-32,	2' - 3'	<.1	<.1						
TP-33,	2' - 4'	<.1	<.1						
TP-33,	9' - 11'	<.1	<.1						
G 18		.4	<.1						
G 21A		<.1	<.1	•					
G 23	•	<.1	<.1						
G 23A		<.1	<.1						

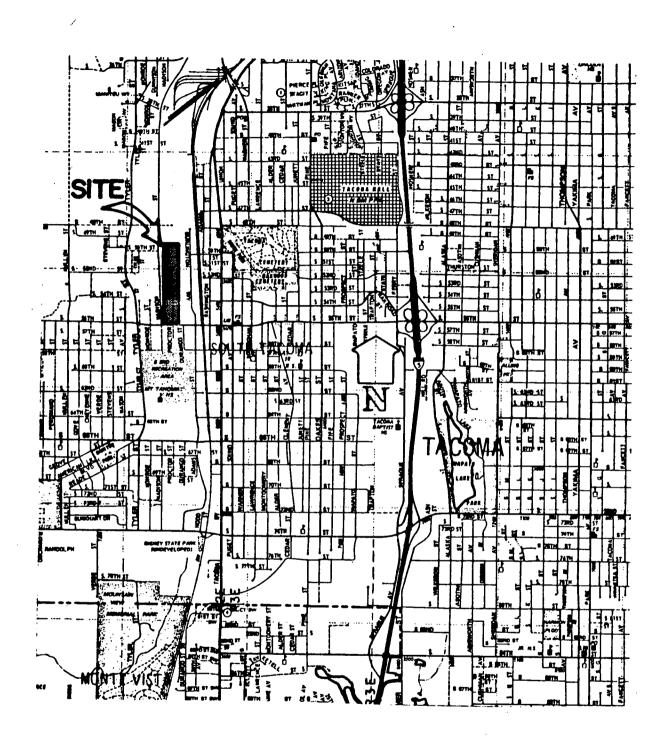
TABLE III

EP TOXICITY SUMMARY OF CHEMICAL ANALYSES

Test Depth Pit Interval	PAH* (mg/g)	нн* (mg/g)	Oil and Grease (mg/g)
TP-24, 0' - 1'	<1	<.01	
TP-22, 2' - 4'	<1	<.01	tan lan any min
TP-24, 7' - 8'	<1	<.01	.064
G 23	<1		
G 23A	<1		
TP-24A, 0' - 1'	<1		
TP-24A, · 1' - 2'		<.01	
TP-28, 0'5'	<1	<.01	1.43
TP-28, 2' - 3'	<1	<.01	
TP-28, 6' - 7'	<1	<.01	0.29
TP-31, 0' - 1'	<1	<.01	
TP-31, 6' - 7'	<1	<.01	
TP-32, 1' - 1.5'	<1	<.01	
TP-32, 4.5' - 5.5'	<1	<.01	4 2 2 2
TP-33, 2' - 4'	<1	<.01	
TP-33, 9' - 11'	<1	<.01	

^{*}PAH - Polycyclic Aromatic Hydrocarbons

^{*}HH - Halogenated Hydrocarbons



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Vicinity Map
Anderson Enterprises Property
Tacoma, Washington

Proj. No. 2560

Date Mar. '85

Plate I

MAJ	OR DIVISIO	DNS	GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTION
	Gravel And	Clean Gravels		GW gw	Well-Graded Gravels, Gravel-Sand Mixtures, Little Or No Fines
Coarse Grained	Gravelly Soils	(little or no fines)		GP gp	Poorly - Graded Gravels, Gravel- Sand Mixtures, Little Or No Fines
Soils	More Than 50% Coarse Fraction	Gravels With Fines (appreciable		GM gm	Silty Gravels, Gravel - Sand - Silt Mixtures
	Retained On No. 4 Sieve	amount of fines)		GC gc	Clayey Gravels, Gravel - Sand - Clay Mixtures
	Sand And	Clean Sand		SW sw	Well-Graded Sands, Gravélly Sands, Little Or No Fines
More Than 50% Material	Sandy Soils	(little or no fines)		SP sp	Poorly-Graded Sands, Gravelly Sands, Little Or No Fines
Larger Than No. 200 Sieve Size	More Than 50% Coarse Fraction	Fines / appreciable		SM sm	Silty Sands, Sand - Silt Mixtures
	Passing No. 4 Sieve			SC sc	Clayey Sands, Sand - Clay Mixtures
		Liquid Limit Less Than 50		ML mi	Inorganic Silts & Very Fine Sands, Rock Flour, Sil Clayey Fine Sands; Clayey Silts w/ Slight Plasticity
Fine Grained Soils	Silts And Clays			CL cl	Inorganic Clays Of Low To Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean
Siajs				OL 0	Organic Silts And Organic Silty Clays Of Low Plasticity
More Than 50% Material Smaller Than No. 200 Sieve Size	Silts			MH mh	Inorganic Silts, Micaceous Or Diatomaceous Fir Sand Or Silty Soils
	And Clays	Liquid Limit Greater Than 50		CH ch	Inorganic Clays Of High Plasticity, Fat Clays
				OH oh	Organic Clays Of Medium To High Plasticity, Organic Silts
	Highly Organic	: Soils		PT pt	Peat, Humus, Swamp Soils With High Organic Contents

Topsoil	ate of the state o	Humus And Duff Layer
•		Highly Variable Constituents

The Discussion In The Text Of This Report Is Necessary For A Proper Understanding Of The Nature Of The Material Presented In The Attached Logs

Notes:

Dual symbols are used to indicate borderline soil classification. Upper case letter symbols designate sample classifications based upon laboratory testing; lower case letter symbols designate classifications not verified by laboratory testing.

2 O.D. SPLIT SPOON SAMPLER 2.4" I.D. RING SAMPLER OR SHELBY TUBE SAMPLER SAMPLER PUSHED SAMPLE NOT RECOVERED

 ∇ WATER LEVEL (DATE)

WATER OBSERVATION WELL

C TORVANE READING, 1sf

qu PENETROMETER READING, tsf

W MOISTURE, percent of dry weight

pcf DRY DENSITY, pounds per cubic ft.

LL LIQUID LIMIT, percent

PI PLASTIC INDEX

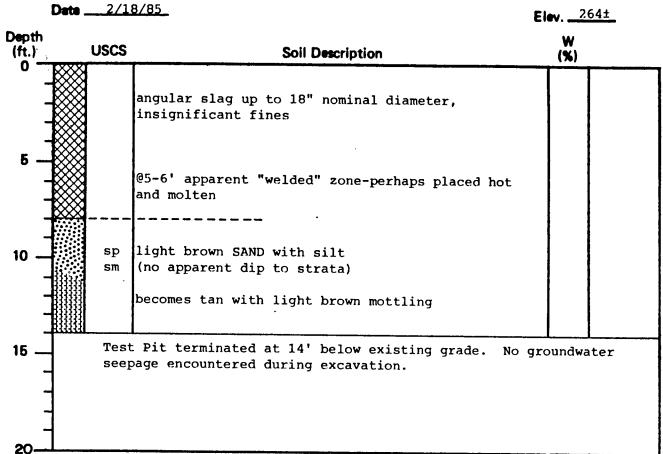
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LEGEND

Proj. No. 2560 Date Mar.'85

TEST PIT NO. _1_





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TEST PIT LOGS

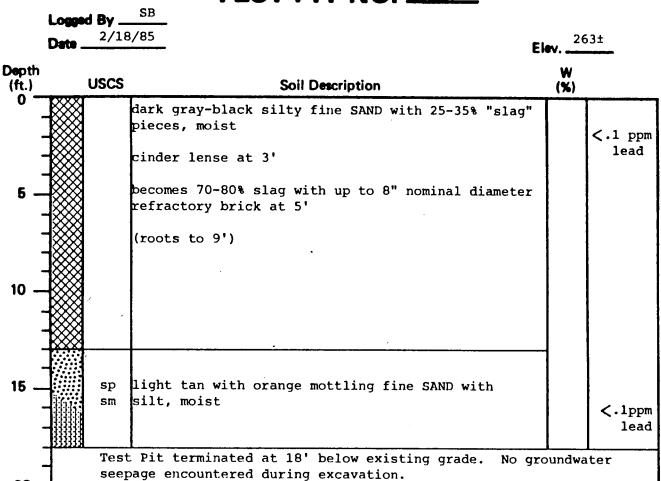
ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

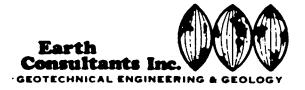
Date Mar. '85

Plate

5



Note-Lead concentrations per EP Toxicity evaluation by Bennett Laboratories

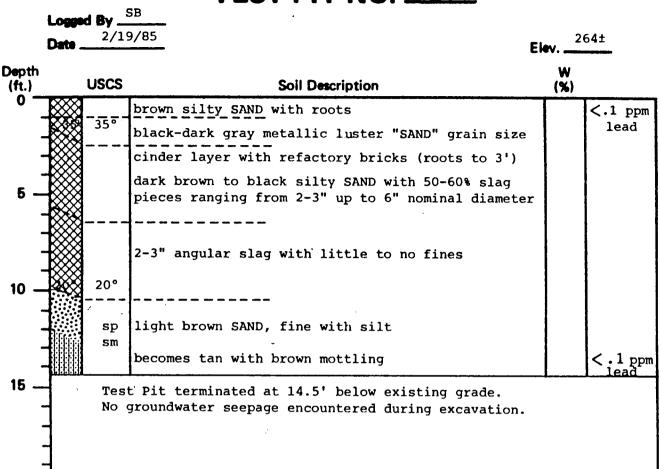


TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85



NOTE: Lead concentrations per EP Toxicity evaluation by Bennet Laboratories.



TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Logged By SB Date 2/18/85 Elev. __262± Depth **USCS** (ft.) Soil Description (%) .3 ppm light brown silty gravelly SAND with lumber debris lead black with some iron staining, silty SAND with 40-50% 2.8ppm slag exhibiting some cementation and minor scrap lead metal, zones of increasing % slag to 70% @ 1.5-3' and 6-7.5' minor isolated zone of FeO, staining @ 18°↓W .2 ppm lead (roots to 9.5') 10 black "slag" up to 18" nominal diameter with little .3 ppm or no fines lead

black silty SAND with trace small slag fragments

tan with orange mottling SAND, fine with silt,

Test Pit terminated at 18' below existing grade. No groundwater seepage encountered during excavation.

NOTE: Lead concentrations per EP Toxicity evaluation by Bennet Laboratories

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moist

decreased mottling

15

TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

<.1 ppm
lead</pre>

Logged By SB Date ____2/18/85 Elev. 263± Depth **USCS** (ft.) Soil Description (%) dark brown SAND with silt, 30-40% slag, wood .4 ppm 30° fragments, gravel lead scattered refractory bricks @ 3-4' predominately and isolated to 7' slag-angular ranging to 8" nominal diameter, some dark brown sandy lenses comprising < 15% by weight, 10° some copper stained pieces-isolated black SAND with silt < 5% slag light brown SAND with silt 10 sp sm becomes tan at 9.5' <.1 ppm lead Test Pit terminated at 13' below existing grade. No groundwater seepage encountered during excavation.

NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories



15

TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Logged By __SB__ 261± Date ___2/18/85 Elev. Depth **USCS** (ft.) Soil Description (%) dark gray silty SAND with < 10% slag, moist 580 ppm lead 20° .6 ppm dark brown/black silty SAND with 40-50% slag, lead moist, exhibiting slight to medium cementation slag up to 20" nominal diameter .1 ppm scattered refractory brick from 6-7' lead 90% slag with fines comprised of slag debris 10 .4 ppm sp' tan/brown mottled SAND lead decreased mottling at 13' .1 ppm lead 15 Test Pit terminated at 15' below existing grade. No groundwater

seepage encountered during excavation.

NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories



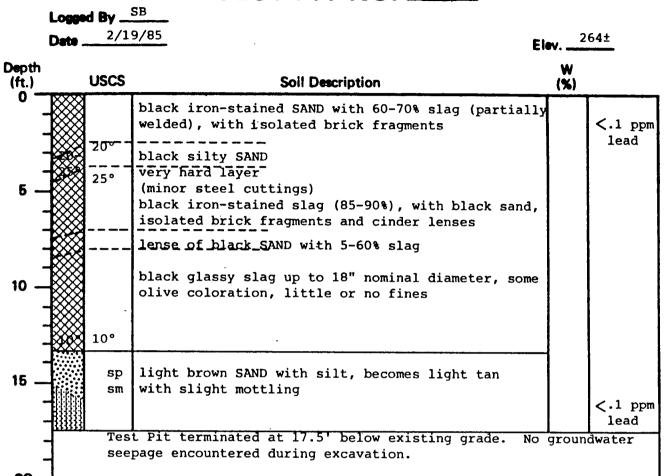
TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85

TEST PIT NO. _7_



NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories



TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85

TEST PIT NO. _8_

Logged By _SB___ 262± Date _____2/18/85_ Elev. Depth **USCS** (ft.) Soil Description (%) black iron-stained coarse SAND, moist, isolated < .1 ppm lumber debris with 40-50% slag lead <.1 ppm lead scattered refractory bricks at 8-9' 20° black slag with little or no fine matrix, slag 10 sizes range to 18" nominal diameter tan/light brown mottled SAND, fine with silt, spmoist 15 sm becomes light tan in color and decreased mottling <.1 ppm lead Test Pit terminated at 18' below existing grade. No groundwater seepage encountered during excavation. 20

NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories



TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85

Logged By _SB___ Elev. 260± Date 2/18/85 Depth **USCS** Soil Description (%) (ft.) tan silty gravelly SAND, moist, loose black SAND with some slag, moist, trace organic <.1 ppm (wood) fragments lead black/brown SAND, fine, with 30% slag pieces < 4" diameter, minor iron stained zones 25° 70-80% black slag with black sand matrix, <.1 ppm well "cemented" lead 10 light tan mottled SAND with silt, fine, moist sp. becomes lighter tan <.1 ppm lead 15 Test Pit terminated at 15' below existing grade. No groundwater seepage encountered during excavation.

NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories



TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Logged By __SB_ Date __2/18/85

Elev. 261±

	Date .	2/10	<u> </u>	Elev2	PII				
Depth (ft.)		USCS	Soil Description	W (%)					
0 -			dark brown iron stained silty SAND with 35-40% slag/gravel		.4 ppm lead				
-			predominately slag up to 12" diameter with little or no fines						
5 -	 		dark gray/black SAND with silt and 15-20% slag		< 1				
-			slag increases to 70-75% with some fine matrix		<.1 ppm lead				
10 -	₩								
-		sp	light brown SAND with silt, moist						
15 —			becomes tan		<.1 ppm lead				
•	_	Test Pit terminated at 15' below existing grade. No groundwater seepage encountered during excavation.							
•									
20-				···					

NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories

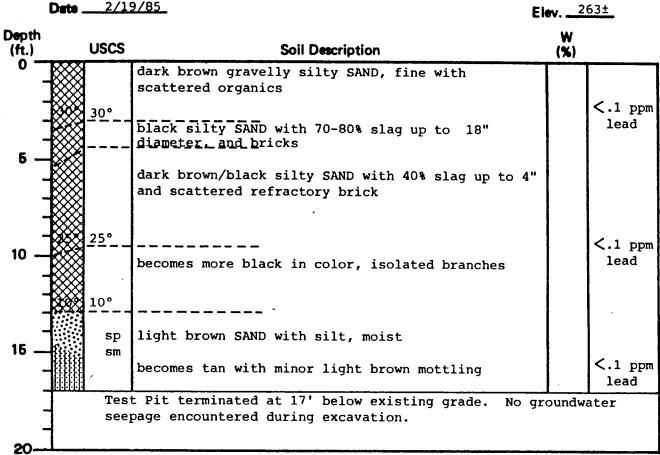


TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Logged By __SB_

Elev. __263±



NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories



TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85

Logged By __SB__ Date 2/19/85 Elev. __263± Depth **USCS** Soil Description (ft.) (%) brown iron stained SAND with silt, 40-50% slag and scattered refractory bricks 30° black SAND, fine to medium, with metallic luster, 10-15% slag < 4" nominal diameter brown iron stained SAND with 60-70% slag up to 12" nominal diameter 30° light brown iron stained gravelly SAND with silt, scattered refractory bricks, slag, scrap iron 10 light brown SAND with silt, becomes tan at 14.5' sp sm 15 becomes tan sandy GRAVEL Test Pit terminated at 17' below existing grade. No groundwater seepage encountered during excavation.

NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories

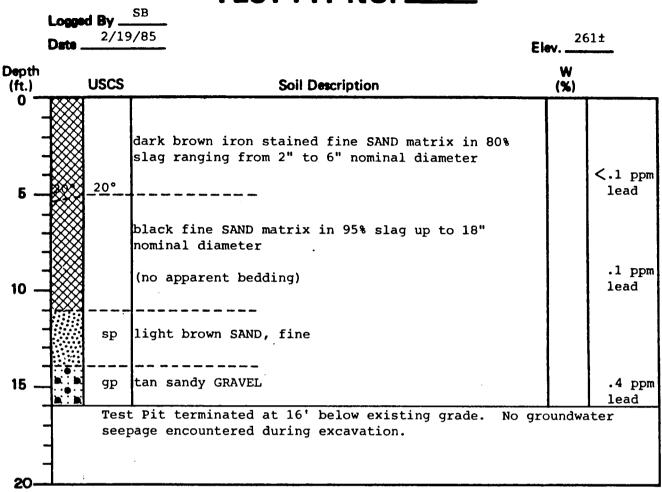


TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date Mar.'85



NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories



TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date

Mar. '85

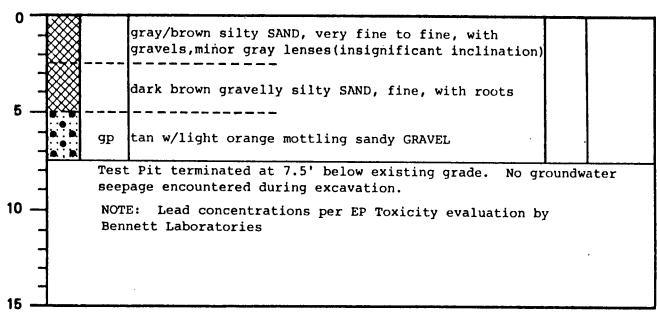
Piate 17

Logged By ___SB Date ____2/19/85 Elev. __264± Depth **USCS** Soil Description (ft.) dark brown/black gravelly SAND with 15-20% slag, moist <.1 ppm gray silty SAND with 30-40% slag, red building lead bricks, concrete footing pad (flat lying contact) dark brown silty gravelly SAND, fine .5 ppm (may be original topsoil?) lead qр tan/orange mottled sandy GRAVEL, fine to medium <.1 ppm becomes grayish at 9' 10 lead Test Pit terminated at 11' below existing grade. No groundwater seepage encountered during excavation. NOTE: Lead concentrations per EP Toxicity evaluation by Benhett Laboratories

Logged By __SB Date __2/20/85_

TEST PIT NO. 15

Elev. 262±



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TEST PIT LOGS

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Proj. No. 2560

Date Mar. '85

Plate

18

Logged By SB
Date 2/20/85

Elev. 262±

Depth (ft.)	USCS	Soil Description	W (%)				
° - ₩	\otimes	isolated slag encountered at 1.5'					
		interbedded light brown/tan silty SAND (predominate) with black sand, fine		.2 ppm lead			
5 —		significant (4") thick lenses black sand at 2.5' and 5'					
10	gp	tan with light orange mottling sandy GRAVEL					
		Test Pit terminated at 10' below existing grade. No groundwater seepage encountered during excavation.					
15		NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories					

TEST PIT NO. _17_

Elev. 252±

0 -			dark brown silty SAND, fine with trace gravel, abundant organic fragments, moist	<.1 ppm lead			
5 -		sp sm	tan with orange mottling fine SAND with silt, moist				
	Test Pit terminated at 6' below existing grade. No groundwater seepage encountered during excavation.						
10 -		NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories					
	=						
15 -	1						

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TEST PIT LOGS

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Proj. No. 2560

Date Mar. '85

Date 2/21/85

Elev. 267±

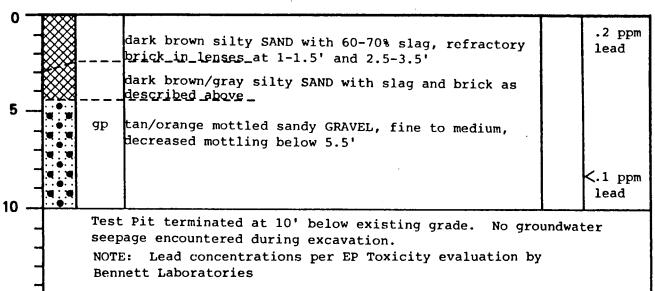
				Elev	
Depth (ft.)		USCS	Soil Description	W (%)	
0 -	\longrightarrow		light brown SAND, fine with gravel	<.1 ppm	
•		7	dark gray/black SAND lense from 1-1.5'	lead	
5 ÷			brown/gray SAND matrix with 80-90% slag/ refractory brick		
			dark brown silty sandy GRAVEL, fine		
•		sp	tan/light orange mottled gravelly SAND, coarse	<.1 ppm	
10 –			becomes grayish @8'	lead	
		seer	Pit terminated at 10' below existing grade. No gropage encountered during excavation.		
	1		: Lead concentrations per EP Toxicity evaluation by ett Laboratories		
15 -					

Logged By SB

2/21/85

TEST PIT NO. 19

Elev. 267±



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TEST PIT LOGS

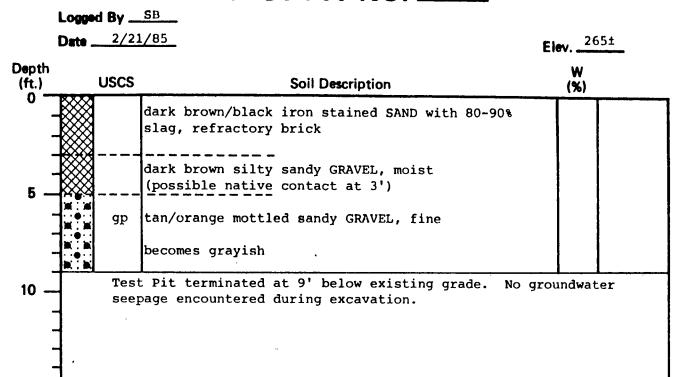
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Proj. No. 2560

Date Mar. '85

Plate

20



Logged By SB ______ **Date** _____ **2/21/85**____

TEST PIT NO. 21

Elev. 266±

0 —————		dark brown silty gravelly SAND, moist	<.1 ppm
5 —		80-90% slab-black/olive with iron stains (some vesicular and ropet pieces), refractory bricks and black_iron_stained fines dark brown/black silty sandy GRAVEL, moist	lead
bi bi	gp	tan/orange mottled sandy GRAVEL, fine becomes light gray/tan at 7'	<.1 ppm lead
10 —		Pit terminated at 8.5' below existing grade. No groage encountered during excavation.	oundwater
		E: Lead concentrations per EP Toxicity evaluation by nett Laboratories	
15			

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TEST PIT LOGS

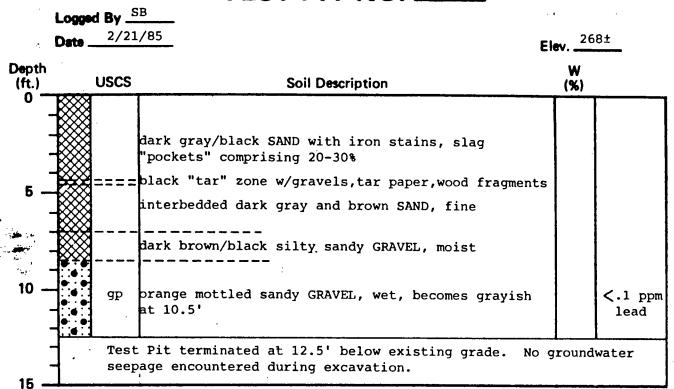
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Proj. No. 2560

Data Mar. '85

Plate

21



Logged By SB
Date 2/21/85

TEST PIT NO. 22A

Elev. _____

0	<u></u>	dark brown/gray iron stained SAND, fine, with 20%	<.1 ppm lead
		30-90% slag with refractory brick and brown sandy	<.1 ppm lead
5		dark brown silty gravelly SAND, fine, moist (appears native-topsoil?)	
10	gp	tan/orange mottled sandy GRAVEL, fine, slight mottling below 7.5'	
	see NO	t Pit terminated at 10' below existing grade. No groundwepage encountered during excavation. TE: Lead concentrations per EP Toxicity evaluation by nnett Laboratories	ater
15			

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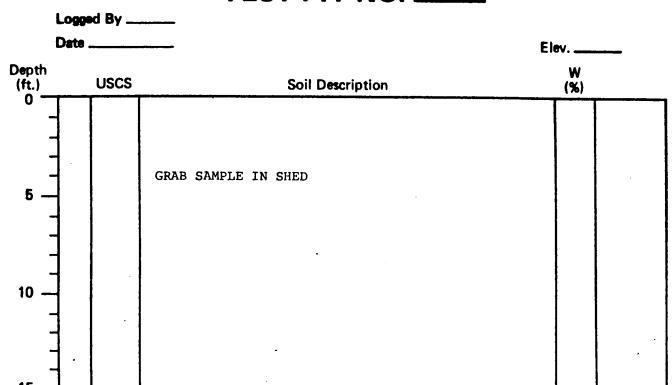
TEST PIT LOGS

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Proj. No. 2560

Date Mar. '85

Plate 22



Logged By . 264± TEST PIT NO. 24 Elev. 2/21/85 <.1 ppm black silty gravelly SAND to sandy GRAVEL with lead silt, high petro. base (?) content, moist to wet

light orange mottled sandy GRAVEL, fine, moist,

becomes tan to grayish at 4.5'

<.1 ppm Test Pit terminated at 8' below existing grade. No groundwater seepage encountered during excavation.

NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories

gр

10

15

TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date Mar.'85 Plate 23

lead

TEST PIT NO. 24A

Logged By __SB 2/21/85 Date __ Depth W **USCS** (ft.) Soil Description (%) <.1 ppm black silty gravelly SAND, moist sm lead becomes dark brown at 1' <.1 ppm lead tan/orange mottled sandy GRAVEL, moist, becomes gp grayish at 4' Test Pit terminated at 8' below existing grade. No groundwater seepage encountered during excavation. 10 Lead concentrations per EP Toxicity evaluation by Bennett Laboratories 15

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TEST PIT LOGS

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Date Mar. '85

Plate

24

Logged By __SB__ Date 2/20/85 Elev. 264± Depth **USCS** Soil Description (%) (ft.) <.1 ppm brown silty SAND, fine with 30-40% slag lead (contains white granular material, precipitation?) \$25-30° <.1 ppm (lense of gray fine slag, coarse sand size on lead east pit wall) brown SAND with coarse slag fragments and increasing slag from 2-6" nominal diameter black siliceous slag and refractory bricks with 10 sp dark brown gravelly SAND with silt sm . tan with slight orange mottling sandy GRAVEL gp <.1 ppm lead 15 Test Pit terminated at 15' below existing grade. No groundwater seepage encountered during excavation.

NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories



TEST PIT LOGS

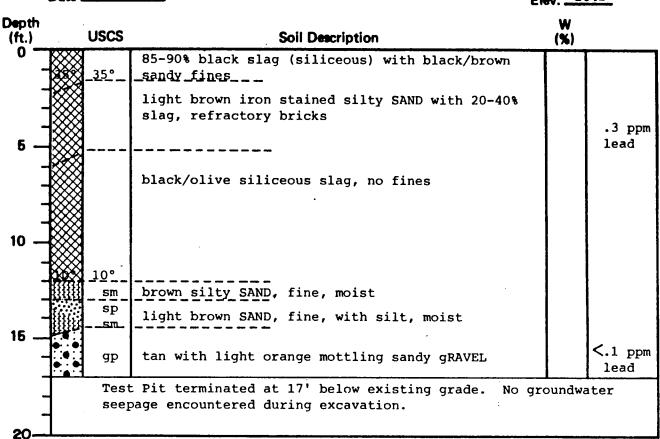
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Date Mar. '85

Plate 25

Elev. 264±



NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories

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TEST PIT LOGS

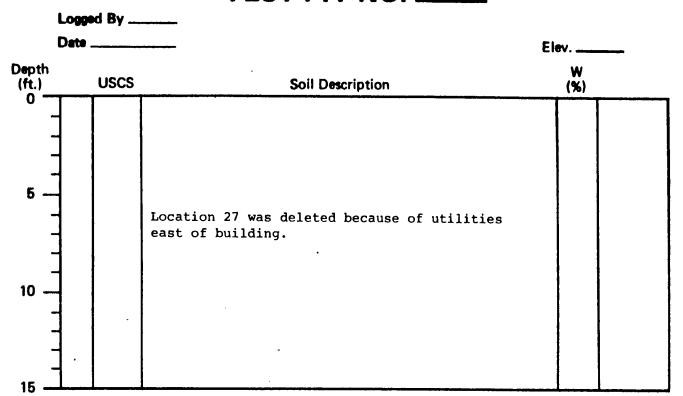
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Proj. No. 2560

Date Mar. '85

Plate

26



Logged By SB TEST PIT NO. 28 2/21/85 Date .. .1 ppm <u>sm</u> black gravelly silty SAND with "oil" sheen & odor lead sm dark brown silty gravelly SAND, moist <.1 ppm lead gp tan/orange mottled sandy GRAVEL, moist <.1 ppm becomes grayish @5.5' lead Test Pit terminated at 7' below existing grade. No groundwater seepage encountered during excavation. 10 . NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories 15

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TEST PIT LOGS

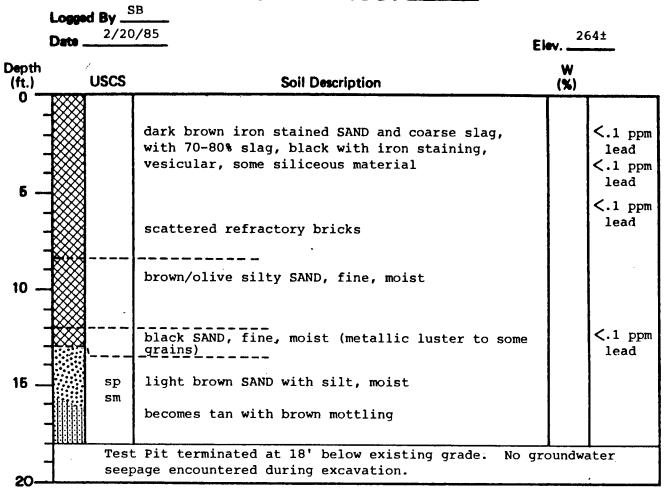
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Proj. No.

2560 Date

ate Mar. '85

Plate 27



NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories



TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Logged By __SB Elev. _____265± 2/21/85 Date_ Depth W **USCS** Soil Description (ft.) (%) black SAND with silt, moist (FILL) .4 ppm dark brown silty gravelly SAND, fine, moist SM lead gm tan/orange mottled sandy GRAVEL with silt, moist becomes tan with slight mottling at 4' gp qm <.1 ppm lead Test Pit terminated at 8' below existing grade. No groundwater seepage encountered during excavation. 10 NOTE: Lead concentrations per EP Toxicity evaluation by Bennett Laboratories

Logged By SB 2/21/85

15

TEST PIT NO. 31

Elev. 265±

0			dark brown silty SAND with trace gravel (FILL)	<.1 ppm
			(pocket of slag from 1-3' at east end of pit) brown silty gravelly SAND, fine to medium	lead
5		gp	tan/slight orange mottling sandy fine GRAVEL	< 1 ppm
10	1		Pit terminated at 8' below existing grade. No grour age encountered during excavation.	ndwater
	-		: Lead concentrations per EP Toxicity evaluation by ett Laboratories	
15]			

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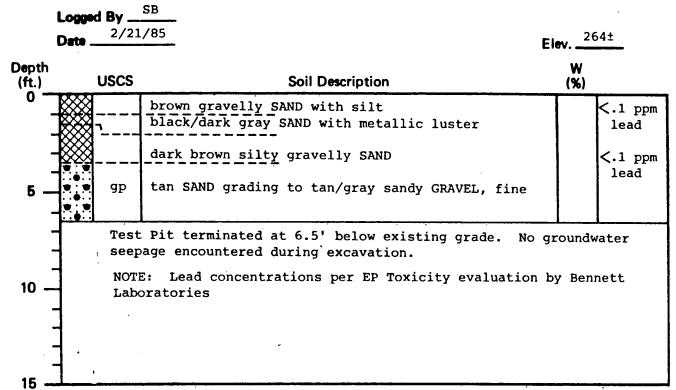
TEST PIT LOGS

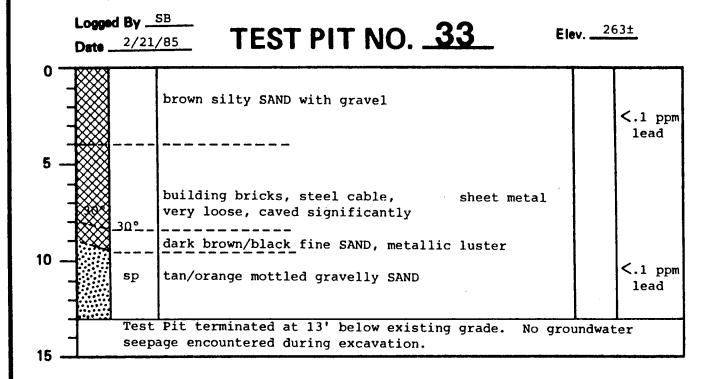
ANDERSON ENTERPRISES PROPERTY
TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85

Plate 29





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TEST PIT LOGS

ANDERSON ENTERPRISES PROPERTY TACOMA, WASHINGTON

Proj. No. 2560

Date Mar. '85

Plate

30

APPENDIX N

BLACK AND VEATCH
MEMORANDUMS TO WDOE - 1985

To:

File

B&V Project 11889.600 June 26, 1985

From: T. L. Rutherford

Subject: South Tacoma Swamp Sampling

Monitoring wells at the South Tacoma Swamp site, which were installed in 1982 during a preliminary site investigation conducted by B&V for EPA, were redeveloped and sampled during the period of June 19 through June 21. The activities conducted each day are described below.

June 19

Mark Snyder and Tom Rutherford of B&V, Fred Gardner of WDOE, and Russ Pryor and Tim Flynn of Hart-Crowser met about 11:30 a.m. near the South Tacoma Swamp site. Much of the time was spent trying to locate all of the wells. Well CBS-13, the 4 inch diameter and deep monitoring well, was found to have been broken into and filled with rocks. The lock and hasp on CBS-06, which is immediately south of CBS-13, had also been broken off but the well was still intact. Wells CBS-06 and CBS-12 were developed by pumping for approximately 1 hour each. Wells CBS-05, CBS-03, CBS-09, and CBS-10 were developed by removing approximately 40 bailer volumes from each well using the dedicated bailers. Well CBS-07 was bailed until dry - approximately 5 bailer volumes. It was not determined if there was sufficient length of rope on this bailer to reach the bottom of the well. None of the locks could be opened by the keys provided, therefore, locks were cut off and replaced.

June 20

Tom Rutherford of B&V and Phil Spadero, Russ Pryor and Tim Flynn of Hart-Crowser met near the site about 10:00 a.m. and began taking water samples. Three casing volumes of water were removed by bailing before sampling each Samples were collected for extractable organics (1 gal. jar), volatile organics (2 - 40 mil. viles), and metals analyses. The metal samples were screened and preserved using HNO3. Water level was read for each well prior to bailing. The temperature, pH, and specific conductivity of the water sample was measured and recorded for each well. Logs were maintained of time and all other field measurements by Hart-Crowser. Doug Pierce from TPCHD came by to help find wells that had not be located. He showed us the location of well CBS-01 but we were unable to find either CBS-08 or CBS-11. is possible that these two wells have been covered by piles of fill. Wells CBS-01, CBS-02, and CBS-04 were developed by removing approximately 40 builer volumes full of water. Samples taken (in order of completion) were CBS-10, CBS-04, CBS-02, CBS-01, CBS-12, CBS-03, CBS-06, and CBS-05. A duplicate sample was collected at CBS-05.

June 21

Hart-Crowser crew of Phil Spadero and Tim Flynn finished sampling wells. Sampled CBS-09 (including duplicate). CBS-07, and Railroad well were not

Washington Department of Ecology -2-South Tacoma Swamp Sampling B&V Project 11889.600 June 26, 1985

sampled. CBS-07 was purged dry, no recharge. Reflroad well water level was low, volume of well high, thus sampling could not be accomplished with equipment on hand. Sampling of Railroad well will be delayed until sampling of monitoring wells at Tacoma Landfill is accomplished.

TLR:kc

cc: Fred Gardner, WDOE

Washington Department of Ecology South Tacoma Swamp Work Assignment No. 1 B&V Project 11889.600 June 28, 1985

To:

Distribution

From:

T. L. Rutherford

Subject: Initial Background Investigation - South Tacoma Swamp

This memo summarizes the work efforts expanded to date on the initial background investigation of the South Tacoma Swamp. These efforts, which are discussed below, include:

- Meetings with WDOE and TPCHD.
- o Review of B&V project files.
- Sampling of existing monitoring wells.

B&V met with WDOE to discuss objectives of the South Tacoma Swamp investigation and to obtain possible sources of information on the site.

B&V met with TCPHD to discuss the site. Doug Pierce of TPCHD provided a report, "South Tacoma Industrial Waste Survey", by himself and Steve Rogers of TPCHD dated 1982. The report discusses the history of the development in the South Tacoma area and presents the findings of a door-to-door survey of waste management practices of firms in the area which have petroleum products or chemicals which, if improperly disposed of, could adversely effect Tacoma's water supply.

B&V conducted a preliminary site investigation of the South Tacoma Swamp under EPA Contract 68-03-1614 in 1982. The objectives of this investigation were to define the potentiometric surface for the area, to perform a magnetometer survey in areas designated by EPA Region 10, and to obtain for analyses samples of surface water, groundwater, surface soil, and subsurface soil at selected locations. Evaluation and interpretation of data collected during the field investigation was to be accomplished by others as directed by EPA.

Figure 1 shows the locations of monitoring wells installed during the investigation and the location of sampling points and magnetometer survey areas. The project files for this investigation and the B&V investigation at Tacoma Well No. 12A were reviewed to determine the site background information collected.

B&V project files for the Remedial Investigation of Tacoma Landfill also contain data and reports of interest to the South Tacoma Swamp investigation. Included in these materials are the Brown & Caldwell Clover/Chambers Creek Geohydrologic Study and the EPA Field Investigation and Feasibility Study report for South Tacoma Channel, Well 12A. Historical aerial photos obtained

Washington Department of Ecology -2-South Tacoma Swamp Work Assignment No. 1

B&V Project 11889.600 June 28, 1985

from EPA for Tacoma Landfill also showed portions of the South Tacoma Swamp site. These photos have been returned to EPA but will be borrowed again.

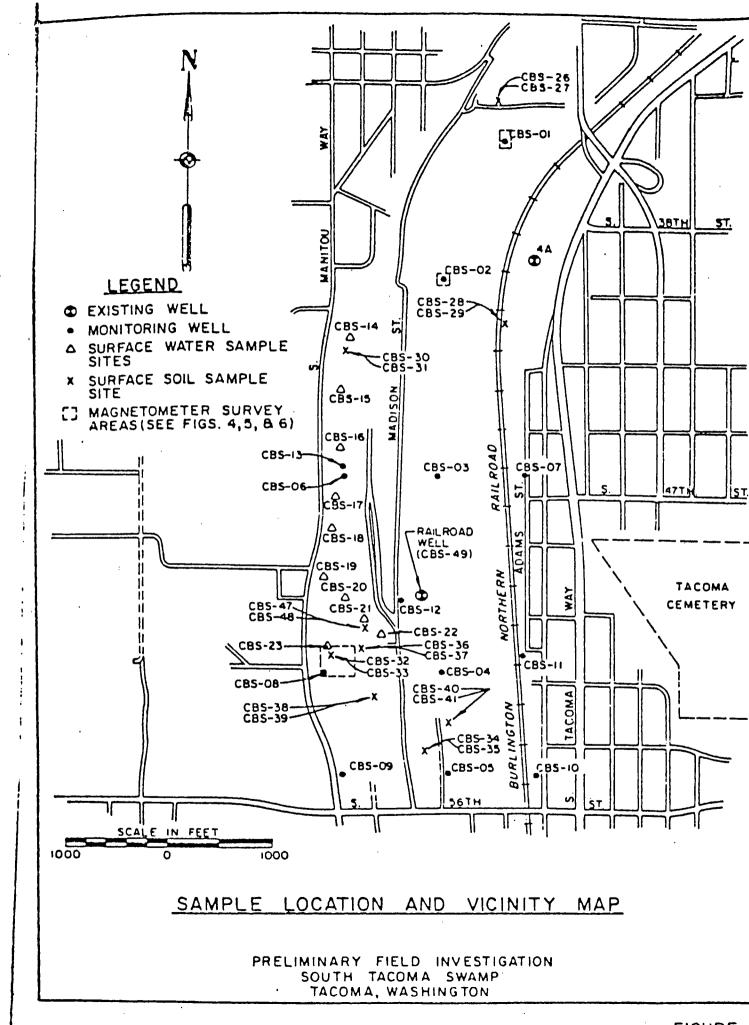
In 1981, Hart-Crowser prepared a brief writeup on the South Tacoma Channel area for the Tacoma Water Department and submitted a proposal for a detailed hydrogeologic study. These project files and other data pertinent to the area (available at Hart-Crowser) will be reviewed as the project proceeds.

The monitoring wells at the South Tacoma Swamp site (see Figure 1) were sampled during the period of June 19 through June 21, 1985. Permission to sample the wells was obtained, by Fred Gardner, from City of Tacoma and property owners. Three of the wells were not sampled because they couldn't be found or were destroyed. See T. L. Rutherford memo of June 26, 1985 for a more detailed description of the sampling effort. The samples were shipped to EPA contract laboratories for analyses. Laboratory turnaround time is unknown.

TLR: kc

Attachment: Figure 1

Distribution: Fred Gardner, WDOE / M. G. Snyder, B&V



CHANGES Cory.

P. O. Box 2700 .203 East 4th Street, Suite 501 Olympia, WA 98507-2700

(206)	754-0515	å.	
15	Fred Gardner	Ecology/ Lacey, WA	
SUBJECT	STSW-1/ Sample no. summary		DATE 1/6/86
1	Enclosed is a listing of sample	numbers and corresponding tr	affic report
	numbers for crossreferencing sam	nples taken by B&V and H-C in	June '85.
	Please give me a call if you nee	ed any other support data.	
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PLASEREDI	SIGNED	lal Smy	
	Ма	rk G. Snyder	
	110	- Shydel	
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		·	
DATE	SIGNED		

WORK. COMPUTED BY_ DALLAS PAGE NO. PROJECT No ____ DENVER FILE No. ORLANDO CM Sunda bunha Traffic Road Winha In. New Sample Number <u>O-4-</u> TS-03A1-2-B Eurh Tawna Swamp CBS-03 JA 512 TS-01A1-2-B " -01 JA 513 TS-02A1-2-B -02 JA 514 TS-B1-00-E 31276 Z12 AT TS-04A1-2-B JA 519 -04 TS-12A1-2-B 1 - 12 JA 520 Ŋ TJ-10A1-Z-B J4 521 TS-09A1-Z-B 11 - 69 JA 527 Z 15-11 A1 -2-B - 11 JA 523 15-06A1-Z-B 11 -06 JA 524 15-1341-2-B 1 - 13 JA 525 75-05A1-2-B 11 - 05 JA 526 TS-04A1-ZKI "-04 MJA 305. 15-05 A1-2-M 11.05 11E ACM T5-13A1-2 T5-09A1-2-M 15-13A1-2-M 11-13 MJA 312 1 - 09 MJA 313 15-11 A1 - Z - M $\mu - \mu$ 41E ATM 15-06A1-Z-M 1 - 06 MJA 315 15-14-1-2-M 1 - 14 MJA 317 15-82-00-M Slowk SIE ACM 15-12A1-2 M N " -12 MJA 324 M- 5-10 A1-2-11 - 10 MJA 325 15-01A1-2 -M " - 01 MJA 326 TS-02 A1-2-M " -02 MJA 327 15-03A1-Z-M :1 11 - 03 MIA 322

¢ K & PROJECT No. DENVER FILE NO. DRLANDO Oll Sunda Vinha Triffic Food Vinha In. Ong. Now Sweet Number TS-53A1-Z-V Sowin Teconor Swamp CBS-03 JA 512 TS-0141-2-V JA 513 TS-UZ A1-Z-V 11-62 34 S14 75- B1-00- V Blank JA 515 ш ٠, 11-04 TS-04A1-Z-V JA 519 TS-12A1-2-Y 11-12 JA 520 TS-10A1-2-Y 11-10 J4 521 15-09 A1-2-V ч JA 527 11-09 Z 15-11 A1 -2-V $H^{-}H$ JA 523 13-06A1-Z-V 11-06 JA 524 15-13A1-2-V 11-13 ١, JA 525 TS-05A1-2-V 11 11-65 JA 526 15-04A1-ZC اسريط 11 MJA 305 11-05 15.05 A1-Z-C ١, 11E ACM F 75-13A1-2C 11-13 ٧. MJA 312 1-04 MJA 313 11 15-11 h - Z-C W μ_{-M} 11 MC + 31+ 15-0671-2-C 11 11-66 MICH 215 15-14-11-2-C 11 11-14 MJA 317 15-BZ-00 SIE ALM 15-12A1-20 11-12 MJA 324 15-10 Al-Z-C. MJA 325 11-10 15-01A1-2-C 11-01 MJA 326 15-02 Al-2C 11-02 MJA 327 15-03 A1-26. MIX 228 11-03

APPENDIX O

ECOLOGY AND ENVIRONMENT INTERNAL MEMORANDUM - 1985

APPENDIX O

ECOLOGY AND ENVIRONMENT INTERNAL MEMORANDUM - 1985



ecology and environment, inc.

108 SOUTH WASHINGTON, SUITE 302, SEATTLE, WASHINGTON 98104, TEL. 206-624-9537

International Specialists in the Environmental Sciences

MEMORANDUM

DATE: August 23, 1985

TO: John Osborn, FIT RPO, USEPA, Region X

FROM: Roger McGinnis, Chemist, E&E, Seattle 72777 Andrew Hafferty, Senior Chemist, E&E, Seattle

SUBJ: QA of Case 4565 (Inorganics) South Tacoma Swamp WA0433

THRU: Dave Buecker, FIT RPM, E&E, Seattle

REF: TDD-R10-8507-01

CC: Gerald Muth, EPA, Manchester Pat Storm, EPA, Seattle

Patricia Krantz, DPO, EPA, Region III

The Quality Assurance review of thirteen samples, Case 4565, collected at South Tacoma Swamp has been completed. Thirteen water samples were analyzed at low level for inorganics by JTC Environmental Consultants, Inc., of Rockville, Maryland. The samples were numbered:

MJA305	HJA314	MJA324
MJA311	MJA315	MJA325
MJA312	MJA317	MJA326
MJA313	MJA318	MJA327
		MJA328

Data Qualifications

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in IFB WA84J091.

- 1) Timeliness No deficiencies.
- 2) Initial Calibration Verfication 1 out of 24 elements out of control.

 Element
 % R
 QA Limit

 Sodium
 112%
 90-110%

The laboratory listed 110 % R for sodium.

Form I

U.S. EPA Contract Laboratory F	Program	<u> </u>
Sample Hanagement Office		EPA Sample No.
P.O. Box 818 - Alexandria, VA 703/557-2590 FTS: 8-557-2490	22313	MJA 305
		Date 1/22/85
INOR	CYNIC YNYT	YSIS DATA SHEET
LAB FAYE JTC Environmental	_Cnslts.	CASE NO. 4565
SOW NO. 784	-	
LAB SAYPLE ID. NO. 71-2044	-	·QC REPORT NO. 203
Elemen	ts Identif	1ed and Measured
Concentration: Low _/		Hedium
Hatrix: Water ✓ Soil		Sludge Ocher
ug/L)oi	r mg/kg dr	veight (Circle One)
1. Aluminum 140		3. Magnesium. 7680
2. Arcimony 5201		Manganese //U
3. Arsenic 6.7U		
4. Barium 26		
5. Beryllium 4.9U		- Nickel /8U
6. Cadalua 🔾		Pocassium H66 LL 1320
		Selenium 3,9U
1,090		. Silver 9.6UJ
		Sodium 2/860 J
10 -	21.	Thallium 26U J
	22.	Tin 3445
11. Iron 414	23.	Vanadium 33 CL
12. Lead 2.44 3	24.	zinc 128 J
Cyanide N.R. Auto	An Per	cent Solids (I) $\mu_{\mathcal{R}}$.
results are encouraged and contained on Cover	ige. Addii d. Defini	standard result qualifiers are used tional flags or footnotes explaining tion of such flags must be explicit vever.
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1 5/6/23		
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Form I

U.S. EPA Contract Laboratory	Page 2
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703/557-2490 FTS: 8-557-2490	I_MJA 324
4	<u>. </u>
INOR	GANIC ANALYSIS DATA SHEET
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PM NO. 784	CASE NO. 4555
LAB SAMPLE ID. NO. 71-2052	
1-2032	QC REPORT NO. 203
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Elemen	cs Idencified and Measured
Low /	——————————————————————————————————————
erix: Water V Soil	Hedium
	Sludge Ocher
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· Aluminum /60	mg/kg dry weight (Circle One)
.700	13. Hagnesius. 5240
	14. Hanganese: //U
Arsenic 6.711	15. Mercury 0. 20 5
Barium 11U	16. Nickel 18U
Beryllium 4.94	
Cadelin 3.6 U	17. Potassium 2910
Alcium 10200	18. Selenium 3.9U
Chrosium 7.94	19. Silver 9.6 U
obale 20U	20. Sodium 27890 J
200	21. Thallium 26U J
Copper 20	22. Tin 3445
100 47	23. Vanadium 33Cc
3d 2411 J	
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For reporting results	to EPA, scandard result qualifiers are used
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and contained on Cover !	Definitional flags or footnotes explaining Page, however.
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# 2 / 4 S	Lab Hanager 27 27



ecology and environment, inc.

108 SOUTH WASHINGTON, SUITE 302, SEATTLE, WASHINGTON 98104, TEL. 206-624-9537

International Specialists in the Environmental Sciences

MEMORANDUM

DATE: August 30, 1985

TO: John Osborn, FIT RPO, USEPA, Region X

FROM: Robert Stuart, Chemist, E&E, Seattle A9A

FCXAndrew Hafferty, Senior Chemist, E&E, Seattle

SUBJ: QA of Case 4565 (Organics)

South Tacoma Swamp WA0433

THRU: Dave Buecker, FIT RPM, E&E, Seattle

REF: TDD-R10-8507-01

CC: Gerald Muth, EPA, Manchester

Edward Taylor, DPO, EPA, Region I

Jack Sceva, EPA, Region X

The Quality Assurance review of twelve samples, Case 4565, collected at South Tacoma Swamp has been completed. Twelve water samples were analyzed at low level by ERCO of Cambridge, Massachusetts for VOAs, BNAs, and pesticides. The samples were numbered:

JA5 12	JA5 19	JA523
JA513	JA520	JA524
JA5 14	JA521	JA525
JA5 15	JA522	JA526

Data Qualifications

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in IFB WA84A-266.

Timeliness

Four VOA samples exceeded the contract holding time between sample receipt and analysis. Sample Traffic Reports were missing.

Sample	Holding Time	QC Limit
JA512	ll days	7 days
JA515	11	7
JA520	11	7
JA523	11	7

Ten BNA samples exceed the contract holding time.

Sample	Holding Time	QC Limit
JA512	15 days	5 days
JA514	· 15	5
JA5 15	<u>15</u>	5
JA519	15 35	5 5
JA520 JA521	15 15	5 5
JA522	15	5
JA523	15	5
JA524	15	5
JA525	15	5
JA526	15	5

- 2) Instrument Tuning Acceptable
- 3) Initial Calibration

Date	Compound	RF	QC Limit
6/30/85	Bromoform	0.23	>0.250

4) Continuing Calibration

Date	Compound	<u>% D</u>	QC Limit
7/1/85	Vinyl chloride	33	<25%
7/12/85	Di-n-octylphthalate	34	<25%

- 5) Detection Limits Acceptable
- 6) Pesticide Standards
 - a) Linearity Acceptable
 - b) 4,4'-DDT/Endrin Breakdown Acceptable
 - c) Dibutylchlorendate Retention Limit Shift Acceptable

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION 10

1200 SIXTH AVENUE SEATTLE, WA 98101

TARGET SHEET

The following document was not imaged.

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	X Oversized		
	CD Rom		
	Computer Disk		
	Video Tape		
	Other:		
*A copy of the do	cument may be requested from the Superfund Records Cente		
	Document Information		
Document ID #:	1427615		
File #:	TSWSF 1.6.2 v.1		
Site Name:	Commencement Bay (TSWSF)		
	Test Pit Location Plan		
	Anderson Enterprises Property		
	Tacoma WA		
	March 1985		

d) Standards Summary - Acceptable, with the exception of:

Date	Column	Compound	<u>% D</u>	QC Limit
7/3/85	2250/2401	Dieldrin	27.3	<20%

- 7) Blanks Acceptable
- 8) Surrogate Recovery

VOAs - Acceptable

BNAs - Seven out of 96 were outside QC limits.

Sample	Compound	% Recovery	QC Limit
JA513	Nitrobenzene	123	41-120%
JA525 (MS)	2-Fluoro-biphenyl	133	41-119
	Terphenyl-d14	570	33-128
	2-Fluoro-biphenyl	133	44-119
	Terphenyl-dl4	569	33-128
ERCO-I	Nitrobenzene-d5	128	41-120
ERCO-I	Terphenyl-dl4	170	33-128

- 9) Matrix Spike and Matrix Spike Duplicates
 - a) Volatile Fraction

The following compounds exceeded RPD QC limits:

Compound	Fraction	RPD	QC Limit
Chlorobenzene	VOA	14	<13
Toluene	VOA	15	<13

b) BNA Fraction

The following compounds exceeded QC limits for % Recovery:

Compound	Fraction	% Recovery	QC Limit
2,4-Dinitrotoluene (MSD)	BNA	20 .	24- 96%
N-nitro-di-n-propylamine (MSD)	BNA	. 39	41-116%
4-Nitrophenol (MSD)	Acid	0	10- 80%
Lindane (MSD)	Pest.	. 50	56-123%
Endrin (MSD)	Pest.	132	56-121%
Endrin (MS)	Pest.	128	56-121%

10) Samples - Acceptable

Case 4565 Page Four

11) Laboratory Contact

The laboratory was contacted on August 13, 1985. See attached telephone contact log.

Data Use

The usefulness of the data is based on the criteria outlined in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses (R-582-5-5-01)." The data is ACCEPTABLE for use except where flagged with data qualifiers which modify the usefulness of the individual values.

Data Qualifiers

- U The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit.
- J.- The associated numerical value is an estimated quantity because quality control criteria were not met.
- R Quality Control indicates that data are unusable (compound may or may not be present). Resampling and reanalysis is necessary for verification.
- Q No analytical result.
- N Presumptive evidence of presence of material (tentative identification).

In Reference	to	Case	No(s):	
4565				

Contract Laboratory Program REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call:	13 August 85	
Laboratory Name:	•	
Laboratory Hame:	ERCO	
Lab Contact:	Heili Stolle	
Region:	\0	
	Fladren Hafferty	
Regional Contact:	Fladrew Hatlerty	
Call Initiated By:	Laboratory X Region	
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	me ERCO/A Divisi	or of ENSECO_	Cas	No	4565	
sborstory Na	me Excert Santa			Report No	1.11.0	
sh Sample ID	No		uc	naport no	68-01-7027	·
le Matris	water		Con	tract No _	1.124185	•
	Authorized By	FM	Dat	e Sample R	6/24/85	
In Marie		Volatile Co				
•	•				AOV & VOA	Chromatogro Ducurt Report
	· Conc	entration. (Low	Medic		and (Duck Report
	Date	Extracted/Prepared		7-5-8	6/29	185 included
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		•		pH	TIME	Shark only
	Con	/Dil Factor		P' '		•
	Perc	ent Moisture				•
	Barr	ent Moisture (Decan	ied) _	<u></u>		\sim
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CAS		(Circle Dive)	N	umber		
Number	Chloromethane	IOMI		9.34.5	1.1.2.2-Tetrachiorpethane	10 11
74.87.3	Bromomethane	10m !	370	8.87.5	1, 2-Dichloropropane Trans-1, 3-Dichloropropene	
74-83-9	Vinyl Chioride	10 M		10051-02-€	Trichloroethene	10 m
75-01-4	Chloroethane	10,11		79.01-6	Dibromochloromethane	10n
75.00-3 75.09-2	Methylene Chloride	101		124-4E 1	1,1,2-Trichloroethane	10 M
67.64 1	Acetone	25 M		79.00.5 71.43.2	Benzene	10 11
75.15.0	Carbon Disultide	10 4		100€1-01-5	cis 1, 3-Dichloropropene	10 M-11
75-35-4	1, 1-Dichloroethene	10 m		110.75.8	2-Chloroethylvinylether	10 m
75-34-3	1. 1-Dichloroethane	10 м		75-25-2	Bromoform	10 м
156-60-5	Trans-1, 2-Dichloroet	hene 10 u		591.78.6	2-Hexanone	104
67-66-3	Chloroform	10 10 10 10 10 10 10 10 10 10 10 10 10 1	1	108 10-1	4-Methyl-2-Pentanone	10 11
107-06-2	.1, 2-Dichloroethane	10 %	250	127-16-4	Tetrachloroethene	1011
78.93 3	2-Butanone			108-88-3	Toluene	10 м
71.85.€	1. 1. 1-Trichloroethar Carbon Tetrachloride			106 90-7	Chiorobenzene	104
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Form I

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4/84

Environmental Protection Agency - ELP Sample Management Office P. D. Box 818. Alexandria, Virginia 22313-703/557-2490 Sample Number JA 512

Organics Analysis Data Sheet (Page 2)

Semivolatile Compounds

*Concentration: Low		
Date Extracted / Prepared.	7-9.	-85
Date Analyzed	_	
Conc/Dil Factor.	2	

	CAS Number		ug/ler ug/Kg (Circle One)
Liel	62-75-9	N-Nitrosodimethylamine	30 n J
LSA	106-95-2	Pheno!	30 m l
	62-53-3	Aniline	3011
77.8	111-44-4	bisi-2-ChloroethyllEther	2011
	95-57-8	2-Chiorophenol	70n
	541-73-1	1.3-Dichlorobenzene	20 14
276	106-46-7	1, 4-Dichlorobenzene	20M
	100-51-6	Benzyl Alcohol	Jon
256	95-50-1	1 2-Dichlorobenzene	20 m
	95-48-7	2-Methylpheno!	20 u
41	39638 32-9	bis!2-chloroisopropyl)Ether	2011
	106-44-5	4-Methylphenol	ايرمد
_ L3B	621-64-7	N-Nitroso-Di-n-Propylamine	20ml
124	67-72-1	Hexachiproethane	20m
عبى		hitrobenzene	30M
518		Hophorone .	201
	88-75-5	2-Nitrophenol	20 M
344	105-67-9	2.4-Dimethylphenol	اسرەچ
	65-85-0	Benzoic Acid	MOG
- 43	111-91-1	bist-2-ChloroethoxyMethane	20 ml
م بو		2 4-Dichlorophenol	20m
20	7	1, 2, 4-Trichlorobenzene	20 M
1	91-20-3	Naphthalene	DOMI
	106-47-8	4-Chioroeniline	20 M
· si	87-68-3	Hexachlorobutadiene	DOW
	59-80-7	4-Chioro-3-Methylphenol	DON
***	91-67-6	2-Methylnaphthalene	201
34	77-47-4	Hexachlorocyclopemadiene	201
516		2 4, 6-Trichlorophenol	7041
	95-95-4	2.4.5-Trichlorophenal	1000
10	91-58-7	2-Chloronaphthalene	20 M
	BE 74-4	2-Naroaniline	اسرود
5 1	8 131-11-3	Dimethyl Phthalate	ا مرصو
	£ 206-96-8	Acenaphthylene .	اسمه
کیلیے ش	99.09.2	3-Nitroeniline	Jon V

CAS Number	ug /l er ug /Kg
18 83:32-9 Acenaphthene	JOM J
SAN 51-28-5 2, 4-Dintrophenol	اسمد
594 100-02-7 4-Nitrophenol	200
132-64-9 Dibenzoluran	201
350 121-14-2 2, 4-Dinnrotoluene	20.1
11.8 606-20-2 2 6-Dinitratoluene	100
70.84-66-2 Diethylphthalate	201
402 7005-72-3 4-Chlorophenyl-phenylethe	י שבי
90686-73-7 Fluorene	204
100-01-6 4-Nitroaniline	100m
LOA 534-52-1 4, 6-Dinitro-2-Methylpheno	ا مرصع ا
LEB 86-30-6 N-Nitrosodiphenylamine (1)	20 m
HIB 101-55-3 4-Bromophenyl-phenylethe	· 20u
98 118-74-1 Hexachlorobenzene	2011
LHA 87-86-5 Pentachlorophenol	1 20 M
91885-01-8 Phenanthrene	POM .
₹18 120-12-7 Anthracene	30 W
645 84-74-2 Di-n-Butylphthalate	801
518 206-44-0 Fluoranthene	100 M
55 92-87-5 Benzidine	204
945 129-00-0 Pyrene	2011
Lag 35-68-7 Butyloenzylohthalate	2011
91-94-1 3.3'-Dichlorobenzidine	20m
348 56-55-3 Benzova Minthracent	20M
648 117-81-7 Dist2-EthylhexylPnthalate	1-6
TLA 218-01-9 Chrysone	20 M
205 117-84-0 Di-n-Octyl Phthelate	20 M
3-d 205-99-2 Benzo(b)Fluorammene	MOE
a ed 207-06-9 Benzalt Fluoranthene	2011
Benzola Pyrane	30 4
193-39-5 Indend1, 2, 3-cd Pyrene	DOM
178 E3-70-3 Dibenus hAnthracene	70 K
191-24-2 Benzo(p.h. Ifferylene	1 20m V

(1)-Cannot be separated from diphertylamine

Rf 12 185

Organics Analysis Data Sheet (Page 3)

Pesticide/PCBs

Concentration Low Medium (Circle One)

Date Extracted/Prepared 6-25-85

Date Analyzed 7-3-85

Conc/Dil Factor. ولا ولا الحالي CAS (Circle One) Number 0.1 MZ Alpha-BHC mt 7 319.84.6 Beta BHC 1030 319.85 7 0.1 Della BHC 19.86 E 0.1 Gamma . BHC (Lindane) 1011 58 89 9 0.1 Heptachlo: 100 176.44 8 0.1 Aldrin 39 P 309 00 2 Heptachior Epozide 0.1 101 - 1024 57-3 0. Endosultan I 959 98 E U 90P 60 57.1 Dielorin. O. A 4 DDE 930 72.55.9 0. 72.20.8 Endin 0. Endosultan li 33213-65-9 0 4 4 DDD 94P 72.54.8 Endrir. Aldenyae 99 F 7421.93.4 0.1 Endosultan Sullate 97 P 1031-07-8 0.1 4 4 .DDT 91/50-29-3 0.2 Methoxychio' 72.43.5 0.1 Endrin Kelone 53494.70.5 0.2 Chiordine 917 57.74.5. 0.2 113 1 8001-35-2 Toxaphene 0.2 Aroclor-1016 12674-11-2 1120 0.2 Aroclor-1221 1057 11104-28-2 1097 11141-16.5 Arocior-1232 0.2 Aroclor-1242 53469-21-9 ישפו Aroclor-1248 12672-29-6 110 0.2 Aroclor-1254 11097-69 1 1671 Arocio: 1260 11096-82-5

V = Volume of extract injected (ut)

Va = Volume of water extracted (ml)

Wa = Weight of sample extracted (g)

V₁ = Volume of total extract (ul)

500	WW NA	v, <u>5∞</u>	v, 2.7
· M E /		•	

Organics Analysis Data Sheet (Page 1)

1	b Sample ID ample Matrix:	Date Extr		D ompo	ontract No Late Sample Rounds fium (Circle 7-1-85	140 68-01-7027 leceived6/24/85	- Rld 18
	CAS Number	Conc/Dil Percent I	Moisture Decar	nied)	pH		ug /lor ug /Kg (Circle One)
_		Chloromethane	10 M		79-34-5	1, 1, 2, 2-Tetrachioroethane	Duit
,,,		Bromomethane	104		78-87-5	1 2-Dichloropropane	104
20		Vinyl Chloride	10 u F		10061-02-E	Trans-1, 3-Dichloropropene	104
		Chloroethane	1001		79.01.6	Trichloroethene	10 M 3'
40	75-09-2	Methylene Chloride	10 m		124-48 1	Dibromochloromethane	
	67-64-1	Acetone	25 M B		79.00.5	1, 1, 2-Trichloroethane	10 10
	75-15-0	Carbon Disulfide	10 m J.	40	71-43-2	cis 1, 3-Dichloropropene	10 M I
90	75-35-4	1, 1-Dichloroethene	10 11		10061-01-5 110-75-8	2.Chloroethylvinylether	10 M
130	75-34-3	1, 1-Dichloroethane	10 11		75-25-2	Bromoform	DUT
	156-60-5	Trans-1, 2-Dichloroethene	100	7	591.78.E	2-Hexanone	10 m J.
	67-66-3	Chloroform	10~		106 10-1	4-Methyl-2-Pentanone	10MJ.
100	107-06-2	1, 2-Dichloroethane	1011		127-18-4	Tetrachiproethene	1011
	78-93-3	2-Butanone	10 m J.		108-88 3	Toluene	100
	71-55-6	1, 1, 1-Trichloroethane	10 M J		108-90-7	Chlorobenzene	1011
6 0	56-23-5	Carbon Tetrachloride	10 M T		100-41-4	Einylbenzene	100
)	108-05-4	Vinyl Acetate		(100-42-5	Siviene	104 =
1 TU	75-27-4	Bromodichloromethane	10m J	3		Tota! Xvienes	1048

For resoning results to EPA, the futuring results qualifiers are used. Additional lays or featnesses explaining results are encouraged. However, the definition of each flag must be explicit.

Makes If the result is a value greater than or equal to the descript hand, report the value

- Bedicates barrageund was professed for but has devected thesens the surround desection forth for the sometic with the U to 8 10UI based on recessary sensoreration. Street on section (This is not recessarily the stateument direction form.) The features should read U. Compound was professed for but not desected. The surround is the number of the number plantable desection first for the semple.
 - d dedicates an estimated value. This fleg is used entrol which perimenting a sengentration for temperimely determined compounds where a 1-1 response is become or when the most spectral data make for the prosency of a compound that meets the atomification criteria but the result is test then the spectral detection and but greater than zero to g 1001

- C This has been as posterior by a CC 'MS. Single services in the Services of CC 'MS. Single services in pasticular 210 ng. of in the final extract provide be services by GC 'MS.
- B This flag is used when the profes is found in the blank as well as a nember it professes possible 'probable the na conservation and works the data user to take depreparation action.

Other specific flags and feathers may be required to properly define the results. If used they must be fully directled to the data summery report.

K Indicates compound was detected and identified, but the concentration is below reporting detection limit.

56

Form 1

Environmental Protection Agency - CLP Sample Management Office P.O. Box 818 - Alexandria, Virginia 22313-703/657-2490

Sample Number
JA513

Organics Analysis Data Sheet (Page 2)

R/18/8

Semivolatile Compounds

*Conceritration: Low		
Date Extracted/Prepared	6-25	5-85
Date Analyzed	3-85	
Conc/Dil Factor.	2	

ľ,	CAS	(1	ug/lorug/Kg	
	Number		(Eircle One)	
# 418 T	62-75-9	N-hitrosodimethylamine	20 M	1
LSA	106-95-2	Phenol	704	5
	62-53-3	Aniline	30W	ឮ
🖪 หะย์	111-44-4	bist-2-ChloroethyllEther	90 m	
	95-57-8	2-Chiorophenol	80m	3
	541.73.1	1.3-Dichlorobenzene	70 W	3
	106-4E-7	1, 4-Dichlorobenzene	90r	7
	100-51-6	Benzyl Alcohol	30m	7
256	95-50-1	1 2-Dichlorobenzene	20 M	2
	95-48-7	2-Methylphenol	30H	
428	3963E 32-9	bis(2-chloroisopropyl)Ether	20 m	٢
<u> ا</u>	106-44-5	4-Methylphenol	20 M	4
148	621-64-7	N-Nitroso-Di-n-Propylamine	304	7
17.1	67-72-1	Hexachloroethane	20 1	-
بخور ر هري	98 95 3	Nitrobenzene	70 M	6
100	78-59-1	Isophorone	20 M	1
57 A		2-hitrophenol	20 M	*
344		2.4-Dimethylphenol	20 M	7
\ 	65-85-0	Benzoic Acid	20 M	3
438		bis!-2-ChloroethoxyMethane	DOM	١
		2.4-Dichlorophenol	20 M	•
240	1120 02 1	1, 2, 4-Trichlorobenzene	20 M	
7.0	91-20-3	Naphthalene	20m	
	106-47-8	4-Chloroaniline	20 M	1
en 4	87-68-3	Hexachlorobutadiene	20,11	<u></u>
21A		4-Chioro-3-Methylphenol	704	1
£10	91-57-6	2-Methylnaphthalene	20 M)
348		Hexachlorocyclopemadiene	204	} .
	<u> </u>	2.4.6.Trichlorophenol	2011]
316	95.95.4	2.4.5-Trichlorophenol	201]
<u>چ</u> و	91.56 7	2-Chloronaphthalene	20 m]
	BE 74-4	2-Naroaniline	70M]
3 1'	£ 131-11-3	Dimethyl Phthalate	20 u]
			20 M	1
	£ 20€-95-8	Acenaphihylene	904	

	CAS	,	ug/lorug/Kg
_	Number		Circle One
18	83-32-9	Acenaphthene	20 n
571	51.28.5	2, 4-Dingrophenol	20 M
	100-02-7	4-Nitrophenol	20 n
	132-64-9	Dibenzofuran	201
350	121-14-2	2, 4-Dintrotoluene	201
	605-20-2	2 6-Dinitrataluene	20.
_	84.66.2	Diethylphthalate	2011
	7005-72-3	4.Chlorophanyl-phenylether	201
	86-73-7	Fluorene	20 N
	100-01-6	4 - Nitroaniline	Jons
٨٥٠	534-52-1	4. 6-Dinitro-2-Methylphenol	30 M
	86-30-6	N-Nitrosodiphenylamine (1)	204
Mil	101-55-3	4-Bromophenyl-phenylether	200
	118-74-1	Hexachlorobenzene	.30 20
	87-86-5	Pentachlorophenol	20u
	\$85-01-8	Phenanthrene	204
	120-12-7	Anthracene	304
	84.74.2	Di-n-Butylphthalate	70u
	206-44-0	Fluoranthene	20 "
	92-87-5	Benzidine	PONJ
يند ا	129-00-0	Pyrone	3011
, <u></u>	85-68-7	Butyloenzylohthalate	2011
	91-94-1	3, 3 - Dichlorobenzidine	204
7.0	56-55-3	BenzolalAnthracene	2011
44	\$117-81-7	bist2-EthylhexylPnthalate	70u
	218-01-9	Chrysene	20 M
<u>D</u>	8117-84-0	Di-n-Octyl Phthelate	20mJ
	205-99-2	Benzolb Fluoranthene	LONJ
3	8 207-0€ 9	Benzolk) Fluoremhene	برمد
2.2	50-32-8	Benzo(a)Pyrene	20 11
1 15	193-39-5	Indenois, 2, 3-cd Pyrene	20 se
-	B ≤ 3.70.3	Dibenza hAnthracene	204
	3 191-24-2	Benzoig h. iPenylene	200
נוני	CALL PROPERTY OF THE PARTY OF T		

(1)-Cannot be asparated from diphertylamine

Sample Number
JA 5/3

AP112165

Organics Analysis Data Sheet (Page 3)

Pesticide/PCBs

Concentration	Medium					
Date Extracted/Prepared 6-25-85						
Date Analyzed	7-3-fs					
Conc/Dil Fact	or. <u>diL=1</u>					
CAS (Circle One)						
m1 319.84.6	Alpha-BHC	0.111				
1034 319.85.7	Be18-BHC	0.1				
103 319 86 E	Delta-BHC	0.1 11				
10:158 89 9	Gamma-BHC (Lindane)	0.11				
100 176.44.8	Heptachle:	0.12				
99 6 309 00-2	Aldrin	0.12				
101 - 1024-57-3	Hepiachior Epoxide	0.12				
959 98-8	Endosutian I	0. 1				
90P 60 57-1	Dielstin	0.1 1.				
938 72.55.9	4 4 .DDE	0.1				
72.20.8	Endrin	0.1 11				
33213-65-9	Endosulfar. II	0.12				
94872.54.8	4 4 .DDD	0, 2				
79/ 7421-93-4	Endin Aldenyae	0.1 2.				
97 / 1031-07-8	Endosullan Sullate	0.1 1				
91/ 50-29 3	4 4 - 007	0.1 11				
72-43-5	Methoxychic	0.2 M				
53494.70	Endrin Ketone	0.1				
917 57.74.5	Chiordanic	0.2 //				
113 1 8001-35-2	Tozaphene	0.2 11				
117 12674-11.	2 Aroclor-1016	0.2 1				
104/11104.28	2 Aroclor-1221	0.24				
109711141-16	5 Aroclor-1232	0.20				
10LH 53469-21-	9 Aroclor-1242	0.2/1				
110 - 12672-29	6 Aroclor-1248	0.2 u				
1677 11097-69	1 Aroclor-1254	0.2 1				
1117 11096-82	-5 Arocior-1260	ULIC				

V₄ * Volume of extract injected (uf)

V_B = Volume of water extracted (ml)

Wg = Weight of sample extracted (g)

Vt = Volume of total extract (ut)

v	500	or W.	NA	V1 -	500	٧	<u> </u>
V.		- 1					

أوجاله فحساحة بالجوا		Y	_	- ·	•
Environmentari		·	22213	201	1657.24SC
D. Box B1E.	WHO.A	AirBine	223.3	, ,,,	

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\neg	\mathbf{L}	5	ш
•	π	<i>-</i>	17

Organics Analysis Data Sheet ... (Page 1)

	Lamina Nam	e ERCO/A Division	of ENSECO	Ca	se No	4565	
	CONSTORY THE !!!	10 17206		מ	Report No	140	
	b Sample ID N	10		-		68-01-7027	
S.	imple Matrix .	water	- 1 4	Co	otract No _	1/24/0	<u> </u>
D	ita Rolanne Ai	nthorized By	<u> </u>	Di	ite Sample R	6/24/8	· /
,	•	•	Volatile C	ompo	unds	,	RE112185
	* . •	Concent	ration. (Low)	Med	ium (Circl	e One)	8/12
			racted/Prepared		7-1-85		
		Date An	lyzed	7-	1-85		
Ł		Date And	Factor.	1	-Ju -		
ł					V''		
		Percent	Moisture				
		Percent	Moisture (Decat	nted) .			
'	CAS	•	ug/lorug/Kg	_	AS	!	ug 1) br ug /Kg tCircle One
	Number		Circle One !		lumber	1 1 2 2-Terrachiproethane	
ku T	7-10-1	Chloromethane	104		79.34 5	1 2 Dichloropropane	104
[74-83-9	Bromomethane	101		76-87-5	Trans 1. 3 Dichloropropent	
20	75.01-4	Vinyl Chloride	1011		10061-02-E	Trichlorpethene	100
60	75-00-3	Chioroethane	I O M		79-01-6	Dibromochloromethane	10 4
140	75-09-2	Methylene Chibride	100		124.4E 1	1.1.2-Trichloroethane	104
		Aceione	10M		79.00.5	Benzene	10 M
1	75.15.0	Carbon Disullide	100	1	71-43-2 10051-01-5	cis 1, 3.Dichloropropent	10 11
40	75-35-4	1. 1-Dichloroethene	1011			3. Culorostuniarunistus.	10 M
130	75 34-3	1. 1-Dichloroethane	104	1	110-75-8 75-25-2	Bromoform	10 4
	156-60-5	Trans-1, 2-Dichloroethene	1011	بن د	591.78.6	2.Hesanone	10.4
w	67-66-3	Chloroform	10.4	1 1		4.Methyl.2.Pentanone	100
	107-06-2	1, 2-Dichloroethane	10 M	ا إ	106 10-1	Tetrachioroethene	102
	78-93-3	2-Butanone	100		127-18-4	Toluene	10 11
טוני	71-55-6	1, 1, 1-Trichloroethane	$\frac{3}{k}$	J	106-8E 3	Chlorobenzene	10 11
	56 23-5	Carbon Tetrachloride	10 M	سنہ ک	106 90-7	Ethylbenzene	10 n
ا ا	108-05-4	Vinyl Acetate	104	7 320	100-41-4		10 4
470	75-27-4	Bromodichloromethane	10,4		100-42-5	Styrene Tota: Xylenes	10 4
<u> </u>	•		•			10th Whenes	

For resorting results to EPA, the following results qualifiers are used Additional Rays or features explaining results are encouraged features the defination of sect that must be expect.

Makes If the result is a value greater than at aqual to the Struction bond, special the soluti

- U Budicases compound was profitted for but has desocred Basers the summers detection time for the sample with the U m g. 10U) bound on reconsory concerns son " Sharm science (This is has necessarily the mattures to direction time 1 The features should read U Command was analysed for but not deserted. The Surrent IS the manufacture past models direction bend for -
- dedicates on agreement value. This Reg is used better when sermating a sencentration for sematinely little milliand permanunda where a 1 1 researcher is best unact BY WHEN THE MESS SENCTED BOTH PROCESSION PROSPUCT of a perfective than more the about teation of north but the result is less than the specified devection binn but seres to then sere to \$ 100;

- C . This has seed on to posticide personators where the Month Cation has been confirmed by GC this Single semesterni posticides 210 mg. ut in the final exilact should be sent amost by GC /MS
- That flag is used when the prolyte is found in the blank as well as a sample is procured persone (probable \$40 No concernment and amore. The Bell was 10 lots ---

Deter Dever seache haps and fearment may be required to grapetly define the results it used they must be fully Brechard and such Brechard or Statemen to the Sets ריטופון קי פורויריעם

E. Indicates compound was detected and identifier, but the contentration is below reporting detection limit.

Form 1

40

99.09 2

Sample Number JA514

Organics Analysis Data Sheet (Page 2)

Semivolatile Compounds

	Medium (Circle One)
Date Extracted/Prepar	ed. <u>7-9-85</u>
Date Analyzed	7-12-85
Conc/Dil Factor.	2

ł	CAS Number		ug/I or ug/Kg (Circle Dine)		nber		ug /l or ug /Kg
1	62-75-9	N-Nitrosodimethylamine	SOME	18 B3-3		Acenaphthene	آ. سرود
	106-95-2	Pneno!	1 m 06	59A 51-2		2.4-Dingrophenol	30 m
150	62-53-3	Aniline	30 M	58A 100.	02.7	4-Nitrophenol	20 M
	111-44.4	bist-2-ChloroethyliEther	80 W	132.		Dibenzolutan	20 m
	95-57-8	2-Chiorophenol	20M	350 121-		2.4-Dinarotoluene	204
	541.73.1	1 3-Dichlorobenzene	20 M	34 536		2 6. Dinarotoluene	20 M
252	106-46-7	1. 4-Dichlorobenzene	20 11	70 #84.6		Diethylphthalate	20 M
1470	100-51-6	Benzyl Alcohol	1406	401700		4-Chlorophenyl-phenylether	20 M
S.C.A.	95-50-1	1. 2-Dichlorobenzene	20 11	10 N 86.7		Fluorene	20 M
200	95-48-7	2-Methylphenol	2011		-01-6	4-Nitroaniline	20 n
·	39638 32-9	bis:2-chloroisopropylitine	20m!	LOA 534		4, 6-Dinntro-2-Methylphenol	20 M
120	106-44-5	4-Methylphenol	70 M	LE 86.	30.6	N-Nitrosodiphenylamine (1)	30M
4	621-64-7	N-Nitroso-Di-n-Propylamine	20 M	418 101		4-Bromophenyl-phenylether	20m
		Hexachloroethane	ا مر ٥٥	98 118		Hexachiorobenzene	30 n
عيد	98-95-3	Milrobenzene	404	64A 87-		Pentachioropheno!	. 30 M
مين	78-59-1	Hophorone	20 m	* 1585-		Phenanthrene	204
	88.75.5	2-Nitrophenol	POMI	715 120		Anthracene	30 u
	105-67-9	2 4-Dimethylphenol	70 u 1	675 84.		Di-n-Butylphthalate	5014
34,	65.85.0	Benzoic Acid	IMORI	718 206		Fluoranthene	30 M
		bist-2-ChloroethoxyMetham		55 82.		Benzidine	1 300
7.5	111-81-1	2. 4-Dichlorophenol	ابرود	715 125	-	Pyrene	2011
	120-83-2	1, 2, 4-Trichlorobenzene	30,0	L74 85.	6B·7	Butyloenzylonthalate	1 30m
. 24	100	Naphthalene	ا مر٥٥	re 91	94-1	3. 3 -Dichlorobenzidine	1 20 m
41		4-Chloroeniline	200	74 56	.55.3	BenzotalAnthracene	1 50 W
	106-47-8	Hexachlorobutadiene	200	1411	7-81-7	bis(2-EthylhexylPhthalate	2011
	6 87-68-3	4-Chloro-3-Methylphenol	2011	WS 21	B-01-9	Chrysene	1 2011
21		2-Meinylnaphihalene	2011	11300	7-84-0	Di-n-Octyl Phthalate	2011
•	91-57-6	Hexachiorocyclope madiene	201	34 20	5.89.2	Benzolb/Fluoranthene	1 50 %
	8 77-47-4	2.4.6-Trichlorophenol	الرمد	19000	7-06-9	BenzolkFluorammene	100
31		2.4.5-Trichlorophenol	204	125	.32-8	Benzo(a)Pyrene	40m
•	95.95-4	2-Chloronaphthalene	ا بيره د	פושבר	3.39.5	Indenois, 2, 3-cd/Pyrene	2011
J	A 91-58-7		اعرهد	9:5 53	1.70.3	Dibenzia hiAnthracene	1 20 1
_	88 74-4	2-Naroaniline	2021		1-24-2	Benzolo h. IPerviene	120n -
_	131-11-3	Dimethyl Phthalate	800				
3	208 96-8	Acenaphthylene 3-Nitroaniline	30m	\Box		separated from dipheritamine	

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Sample Number
JA 5/4

Organics Analysis Data Sheet (Page 3)

Pesticide/PCBs

_		(Low) Medium	(Circle One)
	oncentration	1 25	· ·
D	sie Extracted	VEIRbaien -	
D	ate Analyzed	7-3-85	
	onc/Dil Fact	or <u>dil=1</u>	
_	CAS		ug/light ug/Kg
	Number		(Circle One)
101 F	319.84.6	Alpha-BHC	0.1 4
	319.85.7	Beta-BHC	0.1//
	319-86-8	Delta-BHC	0.1 11
	58.89.9	Gamma-BHC (Lindane)	0.1 1
100 1	76-44-E	Heptachlor	0.1 1
398	309.00.2	Aldrin	0.1 1/
	1024-57-3	Heptachlor Epoxide	0.1 11
	959 98-8	Endosultan i	0.1 11
908	60-57-1	Dieldrin	0.1 1
	72-55-9	4 4 .DDE	· 0.1 11
441	72-20-8	Endrin	0.1 11
	33213-65-9	Endosulfan li	0.1 1
948	72-54-8	4 4 .000	0.1 2
79 6	7421-93-4	Endrin Albehyde	0.1 2.
97 6	1031-07-B	Endosulfan Sulfate	0.1
921	50-29-3	4.4 -DDT	0.1 11
	72-43-5	Methoxychio:	0.2 1
	53494.70.5	Endrin Ketone	0.1
qif	57.74.5	Chiordane	0.2 //
113	8001-35-2	Toxaphene	0.2 11
113	12674-11-2	Arocior-1016	0.1 11
104	111104-28-2	Arocior-1221	0.2 14
10	M11141-16-	Aroclor-1232	0.2 11
104	r 53469-21-1	Arocior-1242	0.2 11
110	P 12672-29-	6 Arocioi-1248	0.2 M
167	11097-69	1 Arocior-1254	0.2 11
	11096-82-		0.2/

/ = Volum	e of	extract	inlected	(ut)
-----------	------	---------	----------	------

Vg = Volume of water extracted (ml)

Wa * Weight of sample extracted (g)

Vt * Volume of total extract (ul)

	500	NA	v. 500	v. 2.7
v	347	or W	1	

Environmental Protection Agency CLP Sample Management Office P. D. Ecs. 818. Alexandral Virginia 22313-703 (557-2490)

Sample Number JA 515

AGA 115

10 m

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10,4

10 M

10.

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104

Organics Analysis Data Sheet (Page 1)

La Si	b Sample ID Imple Matrix	me ERCO/A Division No 17216 Witer Authorized By JF	-M	OC Rep Contract Date Sa	on Noen Noe		/8-S
	•	Date Ext Date And Conc/Di Percent	Volatile Coration. Low racted/Prepared alyzed alyzed Moisture: Moisture (Decan	Medium 7/5 7/5/	(Circle One) /85 85 H	includes	d for time a only for 85
	CAS Number	•	ug/Jorug/Kg (Circle One)	CAS Numb			Ug /lør ug /Kg (Circle One)
. 1	74-87-3	Chloromethane	10 N J	79.34 مى		. 2-Tetrachloroethane	100 J
50	74.83.9	Bromomethane	10 N	370 75.8		ichloropropane	1010
۳	75-01-4	Vinyl Chloride	10 m	330 1006		1, 3-Dichloropropene	CM
40	75-00-3	Chiproethane	ICM	870 75.0		proethene mochloromethane	100
	75-09-2	Methylene Chloride	.10	510 124-		-Trichloroethane	100
	67-64-1	Acetone .	10 11	140 79.0			ICM I
	75-15-0	Carbon Disulfide	100	40 71.4		3. Dichloropropene	1014

1001

CM 1

1010

10,1

ICM

CN

100

1011

10 11

102

Data Resorting Qualifiers

10051-01-5

591-78-6

108 10-1

190 110-75-B

250 127.18.4

160 106 BE 3

7 U 106.90.7

370 100.41.4

100-42-5

474 75 25 2

For removing results to EPA, the following results qualifiers are used Additional flags or footnotes explaining results are encouraged. However, the defination of each flag must be expired

the fire result is a value greater than or squal to the describe here report the volue

1, 1-Dichloroethene

1, 1-Dichloroethane

1, 2-Dichloroethane

1, 1, 1-Trichloroethane

Bromodichloromethane

Carbon Tetrachloride

Chloroform

2-Butanone

Vinyl Acetate

Trans-1, 2-Dichloroethene

75.35.4

130 75.34.3

2 30 67.66.3

104 107-06-2

110 71.55.6

480 75.27-4

156-60-5

78 93 3

56-23-5

108-05-4

- bulicates correcued was profesed for but not detected Basers the minimum desection limit for the sample with the U to \$. 10U) based on recessery concernistion " distribut actions. (This is not reconsarily the mateument detection limit | The footnote should read U Compound was analysed for but not desected. The Burndor of the minimum attainable detaction limit for
 - busicens on exempted value. This flag is used entrewhen enimaling a tencementalism for terminatively aderestical compounds where a 1 1 response it sesumed Or sure the head spectral data reducates the presence of a perferound than meets the adentification triperia but a seed than the specified denotion born but

This fleg explies to posticide persmaters where the mentification has been confirmed by GC 'MS Single eemponent pesticides≥10 ng. of in the fine lettract should be confirmed by GC MS

cis. 1. 3. Dichloropropene

2. Chloroethylvinylether

4-Methyl-2-Pentanone

Tetrachloroethene

Chlorobenzene

Ethylbenzene

Total Xylenes

Bromoform

2-Hezanone

Toluene

Styrene

This fleg is used when the analyse is found in the blan as well as a sample it indicates somethic grabable Siene contemination and warrs the date user to late AMOUNT COPY AS NO SECTION

Debur - Donor specific flags and featherst may be required to preparity define the results. If used they must be fully Street ded and such description proceed to the deta Prodes & Proced

Emirronmental Protection Agency - CLP Sample Management Office P. D. Box 818. Alexandria, Virginia 22313-703/857-2490 Sample Number
JASIE

A(1)65

Organics Analysis Data Sheet (Page 2)

Semivolatile Compounds

Concentration: Low Medium (Circle One)

Date Extracted/Prepared 7-10-85

Date Analyzed 7-12-85

Conc/Dil Factor: 2

}			(Ya	
	CAS	(e	g/lorug/Kg (Circle One)	
	Number			
411	62-75-9	N-Nitrospoimethylamine	30 MJ	•
451	108-95-2	Phenol		5
. !	62-53-3	Aniline	30 M	2
	111-44-4	bis:-2-ChloroethylÆther	20 u 1	ί,
244	95-57-8	2-Chiorophenol	20 m 1	,
268	541.73.1	1 3-Dichlorobenzene	20 M	3
17A	106-46-7	1,4-Dichlorobenzene	70 A	:
	100-51-6	Benzyl Alcohol	20 m	
256	95-50-1	1, 2-Dichloropenzene	20 M	3
	95-4B-7	2-Methylphenol	20 M	
418	39638 32-9	bisi2-chloroisopropyl)Ether	20 M	
	106-44-5	4-Methylphenol	20 M	{ !
638	621-64-7	N-Nitroso-Di-n-Propviamine	20 M	1
133	67-72-1	Hezachloroethane	20 11	₹.
عبو	98-95-3	Nitrobenzene	20 M	1
548		Isophorone	204	4
51 A		2-Nitrophenol	20 M	43
344		2. 4-Dimethylphenol	20m	1
<u> </u>	65-85-0	Benzoic Acid	20 M	4
47	111-91-1	bist-2-ChloroethoxyMethane	20 M	4
3.4	120-83-2	2 4-Dichlorophenol	20 M	Ц
-		1, 2, 4-Trichlorobenzene	20 M	Ц
2.5	01.20.3	Naphthalene	70 M	Ц
· EL	106-47-8	4-Chloroshiline	20 M	Ц
	6 87-68-3	Hexachlorobutadiene	20 M	Ц
		4-Chloro-3-Methylphenol	20 M	Ц
37	91-57-6	2-Methylnaphthalene	2011	Ц
		Hexachlorocyclopemadiene	20 M	
23	100 06 3	2.4.6.Trichlorophenol	70 M	
31	95 95-4	2.4.5-Trichlorophenol	20 M	
	91.58 7	2-Chloronaphthalene	20.10	
-E	68 74-4	2-Naroaniline	201	1
, ,	18 131-11-3	Dimethyl Phthalate	20 M	
		Acenaphinylene	2015	L
] 3	99.09.2	3. Naroandine	ZDM	Ī
J	82.02.7	13-44-56		

	CAS		ال ولا اطرا/ ولا
	Number		Circle One
IBE	33-32-9	Acenaphthene	30 m .T
59A	51-28-5	2, 4-Dinitrophenol	20 M
	100-02-7	4-Nitropheno!	20 M
T	132-64-9	Dibenzoluran	20 m
5 0	121-14-2	2. 4-Dinnrotoluene	20 L
	606-20-2	2 6-Dinitratoluene	20 M
	84-65-2	Diethylphthalate	20 m
	7005-72-3	4-Chlorophenyl-phenylether	20.0
	85-73-7	Fluorene	20 M
	100-01-6	4-Nitroaniline	20 u
۸م	534-52-1	4, 6-Dinitro-2-Methylphenol	20 M
.,,	86· 3 0·6	N-Nitrosodiphenylamine (1)	201
ar R	101-55-3	4-Bromophenyl-phenylether	20 m
= A	118-74-1	Hexachiorobenzene	20 m
L	87-86-5	Pentachioropheno!	20 n
	85-01-B	Phenanthrene	20 M
	120-12-7	Anthracene	201
	84.74.2	Di-n-Butylphthalate	2011
	206-44-0	Fluoranthene	7019
510	92-87-5	Benzidine	204
200	129-00-0	Pyrene	20,4
273	85-68-7	Butylbenzylphthalate	20 M
	91-94-1	3.3 Dichlorobenzidine	20 M
	56-55-3	Benzos Anthracene	204
411	117-81-7	bis/2-EthylhexylPnthalate	20 m
	218-01-9	Chrysene	2011
	8117-84-0	Di-n-Octyl Phthalate	20 m
	205-99-2	Benzolb)Fluoramhene	20 M
	207-0€-9	Benzolk/Fluoranthene	70 M
2.2	50.32-8	Benzala Pyrene	204
1.5	193.39.5	Indenol 1, 2, 3-od/Pyrene	70 m
	£3.70.3	Dibenzia, hjAnthracene	1 MOS
۳.	191-24-2	Benzogo h. iPerviene	70m 1

(1)-Cannot be separated from diphenylamine

Sample Number JA 515

Organics Analysis Data Sheet (Page 3)

Pesticide/PCBs

(Circle One) Low Medium Concentration. Date Extracted/Prepared 6-24-F5

Date Analyzed 7-3-85

Conc/Dil Factor. VIL=1					
	CAS	- ,	(Circle One)		
_	Number		1 11		
	319-84-6	Alpha-BHC	1 1		
1030	319-85-7	Beta-BHC	0.1 2/1		
	319-86-6	Delta-BHC	0.1		
1011	56.89 9	Gamma-BHC (Lindane)	0.10		
	76-44-B	Heptachior	0.12		
39P	309.00.2	Aldrin	0.12		
1019	1024-57-3	Heptachlor Epoxide	0.1 M		
	959 98 8	Endosultan I	0.1 11		
90P	60-57-1	Dieldrin	0.1 1		
	72-55-9	4.4.DDE	0.1		
	72·20·B	Endrin	0.1 U		
*******	33213-65-9	Endosulian II	0.1 1		
946	72-54-8	4 4 -DDD	0.1		
-	7421-93-4	Endrin Aldehyde	0.1 24		
976	1031-07-8	Endosulfan Sulfate	0.1 2		
91/	50-29-3	4.4 -DDT	0.1 11		
	72-43-5	Methozychlor	0.2 M		
	53494-70-5	Endrin Ketone	0.1 4		
91	57.74.9	Chlordane	0.2 M		
	8001-35-2	Toxaphene	0.2 M		
121	12674-11-2	Arocior-1016	0.2 M		
107	11104.28.2	Aroclor-1221	0.24		
	r11141-16-5	Aroclor-1232	0.2 K		
101	r 53469-21-9	Aroclor-1242	0.211		
114	+ 12672·29·6	Arocior-1248	0.2 M		
167	11097-69-1	Arocior-1254	0.2 4		
	P 11096-82-5		0.2 Mi		

V₄ * Volume of extract injected (ul)

Va * Volume of water extracted (ml)

W_g = Weight of sample extracted (g)

Vt = Volume of total extract (ul)

v	500	or W.	NA	v₁ <u>5∞</u>	v, <u>2.7</u>
w .					

Organics Analysis Data Sheet (Page 1)

			(Pag	e 1)			
اما	b Sample ID	Date Extra Date Anal Conc/Dil	Volatile Contion. Low cred/Prepared yzed	Co Da Da Ompo Medi	Report No — ntract No — te Sample Runds um (Circle 7-1-85	68-01-7027 60110006/24/85	
,	CAS		Noisture ————————————————————————————————————	C	AS lumber		ug 'lor ug 'Kg (Circle One)
	Number	Chloromethane	10 m	150	79-34-5	1 1 2 2 Tetrachloroethane	104
	74-87-3	Bromomethane	10 M		76-87-5	1.2.Dichloropropene	<u> 10 u</u>
	74.23.9	Vinyl Chieride	101		10061-02-E	Trans-1, 3-Dichloropropene	10 sc.
120	75.01-4	Chiprocthane	IDM		75.01.6	Trichloroethene	10 M
	75-00-3 75-09-2	Methylene Chioride	10 44		124-4E 1	Dibromochloromethane	10 4
	67.64 1	Actions	254		79-00-5	1, 1, 2-Trichloroethane	10 M
	75.15.0	Carbon Disuffide	10 11	40	71-43-2	Benzene cis 1, 3-Dichloropropene	10 M
	75-35-4	1.1-Dichloroethene	10 M	1	10051-01-5	2-Chloroethylvinylether	10 %
	75-34-3	1. 1-Dichloroethane	10.	1	110-75-8	Brompform	10,4
	156-60-5	Trans 1, 2-Dichloroethene	104	1 423	75-25 2	2-Heishone	IDA
		Chloroform	100	1 1	591.78.6	4-Methyl-2-Pentanone	104
	107-06-2	1, 2-Dichloroethane	104		106 10-1	Tetrachioroethene	10 M
	78 93 3	2-Buranone	10 M		127-16-4 106-86-3	Toluene	10 μ
., u	71-55-6	1, 1, 1-Trichloroethane	10m	1 -	106 90 7	Chlorobenzene	1011
	56 23 5	Carbon Tetrachloride	104	1	100-41-4	Ethylbenzene	10,4
} ==	108-05-4	Vinyl Acetate	10 M	1 5	100-42-5	Siviene	104
471	75.27-4	Bromodichloromethane	104	J		Total Xylenes	10n
						والمستوالة فيتها والمستوالين والمستوالين والمستوالين والمستوالين والمستوالين والمستوالين والمستوالين	

Date Repairing Dustrians

For removing results to EPA, the february results qualifiers are used Additional flags or featheres papering results are ancouraged. However, the definaces of each flag must be explicit.

- Statute of the result is a value greater than or aqual to the descript four than the value
 - Butterner perspected uses produced for but not derected flagger the semination detection from the pie perspect with the U to g. 10UI board on receptable gencentration. The desirate product road U. Compound uses produced for but not detected. The detection is the transfer product road U. Compound uses produced for but not detected. The detection is the transfer personal detection being for the personal.
 - distinctions on participated value. This flag is used prime; service assumenting a percentage only to perpendic at the properties of personnel of a personnel than meets the absorbing that properties of a personnel than meets the absorbing that the but the properties are about the personnel of the properties of the properties are about the personnel of the perso

- C. This flag besties to posticide porameters where the above confirmed by GC 1MS. Single assessment posticides 210 ng. of on the final excision proud by GC 1MS.
- B. This flog is used when the profite is found in the blank as well as a series. It indicates passage 'probable the ne consummental and warrs the data use: to talk gapting the action.
- Ower Direct specific flags and features and he required to presently define the results. If used they must be fully described and such described an exacted to the data burning report.
 - K Indicates compound was detected and identified, but the concentration is below reporting detection limit.
- Form i

70

Environmental Protection Agency. CLP Sample Management Office P. O. Box 818. Alexandria, Virginia 22313-703/\$57-2490

Sample Number JA519

Organics Analysis Data Sheet (Page 2)

Semivolatile Compounds

*Concentration: (Low)		
Date Extracted/Prepared	7-9-8	15
Date Analyzed	-85	
Conc/Dil Factor	٤	

Number Circle One Number Circle Che	CA	A C	6	ig /l or ug /Kg	CAS		(ug /lor ug /Kg
SA 106-95-2 Pheno' 20 34 51-28-5 2.4-Dinitropheno' 26 62-53-3 Aniline 20 32 4100-02-7 4-Nitropheno' 26 32 411-33-1 3.5-Dinitrophenol 20 32 41-33-1 3.5-Dinitrophenol 20 32 41-33-1 3.5-Dinitrophenol 20 32 40-02-02-02 2.6-Dinitrophenol 26 32 41-33-1 3.5-Dinitrophenol 20 32 40-02-02-02 2.6-Dinitrophenol 26 32 40-02-02-02 2.6-Dinitrophenol 26 32 40-02-02-02-02 2.6-Dinitrophenol 26 32 40-02-02-02-02-02-02-02-02-02-02-02-02-02	_				Number		(Circle One)
106.95.2 Pheno:	1.162	2.75.9	N-Nitrosodimethylamine	20 M J	18 83-32-9	Acenaphthene	20.5
S2-53-3 Antiline 20 M S4-100-02-7 S4-Nitrobehol 20 M S4-55-8 2-Chlorophenol 20 M S4-55-8 2-Chlorophenol 20 M S4-55-8 2-Chlorophenol 20 M S4-55-8 2-Chlorophenol 20 M S4-55-8 2-Chlorophenol 20 M S4-55-8 2-Chlorophenol 20 M S4-56-2 2-S-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-	5 1D	DE-95-2	Pneno!		594 51-28-5	2, 4-Dinitrophenol	30 n l
132-64-9 Dibenzoluran 20 132-64-9 Dibenzoluran 20 24 95-57-8 2-Chlorophenol 20 25 121-14-2 2-4-Dintrotoluran 24 21 24-Dintrotoluran 24 22 25-Dintrotoluran 24 23 24-Dintrotoluran 24 23 24-Dintrotoluran 24 23 24-Dintrotoluran 24 23 24-Dintrotoluran 24 24 24-Dintrotoluran 24 25 25 25 25 25 25 25			Aniline		594 100-02-7	4-Nitrophenol	201
24A 95:57-8 2-Chlorophenol 20 35 21-14-2 2.4-Dinitrobluene 26 28 541-73-1 1.3-Dichlorobenzene 20 1 34.666-20-2 2.5-Dinitrobluene 26 34.666-20-2 2.5-Dinitrobluene 26 34.666-20-2 2.5-Dinitrobluene 26 34.666-20-2 2.5-Dinitrobluene 26 34.666-20-2 2.5-Dinitrobluene 26 34.666-20-2 2.5-Dinitrobluene 26 34.666-20-2 2.5-Dinitrobluene 26 34.666-20-2 2.5-Dinitrobluene 26 34.6060-20-2 2.5-Dinitrobluene 26 36.546-2 36.54-2	1		bis!-2-ChloroethyllEther	20 M	132-64-9	Dibenzoluran	2001
2 3 501-73-1 1 3 - Dichlorobenzene 20 M 34 506-20-2 2 5 - Dinatrolouene 20 M 34 506-20-2 2 5 - Dinatrolouene 20 M 36 56 5 - 2 Diethylphthalate 20 M 300-51-6 8 enzyl Alcohol 20 M 305-65-2 Diethylphthalate 20 M 305-65-1 1 2 - Dichlorobenzene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-73-7 Fluorene 20 M 306-85-7-7 Fluorene 20 M 306-85-7-7 Fluorene 20 M 306-85-7-7 Fluorene 20 M 306-85-7-7 Fluorene 20 M 306-85-7 Fluorene 20 M 306-85-7 Fluorene 20 M 306-85-7 Fluorene 20 M 306-85-7 4 - Fluorene 20 M 306-85-7 30					350 121-14-2	2, 4-Dinarotoluene	201
106.46 7 1 4.Dichlorobenzene 20 M 1			1.3-Dichlorobenzene		3LE 606-20-2	2 6-Dingrotoluene	20 1
100.51.6 Bentyl Alcohol 20 M 30 N86.73.7 Fluorene 20 M 30 N86.73.7 Fluorene 20 M 30 N86.73.7 Fluorene 20 M 30 N86.73.7 Fluorene 20 M 30 N86.73.7 Fluorene 20 M 100.01.6 4-Nitroaniline 2	10	06.46.7	1 4-Dichlorobenzene		₩ 84·66·2	Diethylphthalate	ROM
258 95.50.1 1.2-Dichlorobenzene 20 м 96.86-73-7 Fluorene 20 м 95.48-7 2-Methylphenol 20 м 100-01-6 4-Nitros niline 20 м 100-01-6 4-Nitros niline 20 м 106-44-5 4-Methylphenol 20 м 2			Benzyl Alcohol		408 7005 72.3	4-Chiorophenyl-phenylether	اسمر
95.48.7 2-Methylphenol 20 m 100-01-6 4-Mittoaniline 20 m 106-44.5 39838 32-8 bis/2-chloroisopropylither 20 m 6534-52-1 4, 6-Dinitro-2-Methylphenol 25 m 26 m 20 m 22 m			1 2-Dichlorobenzene		90686-73-7	Fluorene	20 11
#18 39538 32-8 bis(2-chloroisopropyl)Ether			2-Methylphenol	- 1	100-01-6	4 - Nitros niline	2011
106-44-5					LOA 534-52-1	4. 6-Dinnro-2-Methylphenol	MOE
4.38 621-64-7 N-Nitroso-Di-n-Propylamine 20 418 101-55-3 4-Bromophenyl-phenylether 20 418 67-72-1 Hexachloroethane 20 418 118-74-1 Hexachlorobenzene 20 418-78-5-3 Nitrobenzene 20 418-78-5-5 Pentachlorophenol 20 548 78-59-1 Isophorone 20 418-85-01-8 Phenanthrene 20 548 88-75-5 2-Nitrophenol 20 418-85-01-8 Phenanthrene 20 548 88-75-5 2-Nitrophenol 20 418-85-01-8 Phenanthrene 20 548 88-75-5 2-Nitrophenol 20 418-84-74-2 Di-n-Burylphthalate 20 55-85-0 Benzoic Acid 20 418-84-74-2 Di-n-Burylphthalate 20 55-85-0 Benzoic Acid 20 418-84-74-2 Di-n-Burylphthalate 20 55-85-0 Benzoic Acid 20 418-84-74-2 Di-n-Burylphthalate 20 55-85-0 Benzoic Acid 20 418-84-74-2 Di-n-Burylphthalate 20 55-85-7 Benzoic Acid 20 418-85-85-7 Benzoic Acid 20 418-85-85-7 Benzoic Acid 20 418-85-85-7 Benzoic Acid 20 418-85-85-7 Burylphithalate 20 418-85-85-7 Burylphithalate 20 418-85-85-7 Burylphithalate 20 418-85-85-7 Benzoic Acid 20 418-85-85-7 Burylphithalate 20 418-85-85-7 Burylphithalate 20 418-85-85-7 Benzoic Acid 20 418-85-85-7 Burylphithalate 20 418-85-85-7 Benzoic Acid 20 418-85-85-7 Benzoic Acid 20 419-85-85-7 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-8 Benzoic Acid 20 419-85-85-85-8 Benzoic Acid 20 419-85-85-85-8 Benzoic Acid 20 419-85-85-85-85-85-85-85-85-85-85-85-85-85-					L12 86-30-6	N-Nitrosodiphenylamine (1)	20 M
134 67-72-1 Hexachiprocitiane 20						4-Bromophenyl-phenylethe	20x 1
## 87-86-5 Pentachlorophanol 20 ## 87-86-5 Pentachlorophanol 20 ## 87-86-5 Pentachlorophanol 20 ## 87-86-5 Pentachlorophanol 20 ## 88-76-5 Pentachlorophanol 20 ## 88-76-5 Pentachlorophanol 20 ## 88-76-5 Pentachlorophanol 20 ## 88-76-5 Pentachlorophanol 20 ## 88-76-5 Pentachlorophanol 20 ## 88-76-7 Anthracene 20 ## 88-76-7 Anthracene 20 ## 88-76-7 Di-n-Burylphthalate 20 ## 88-76-8 Pentachlorophanol 20 ## 88-76-8 Pentachlorophanol 20 ## 88-76-8 Pentachlorophanol 20 ## 88-76-8 Pentachlorophanol 20 ## 88-76-8 Pentachlorophanol 20 ## 88-76-8 Pentachlorophanol 20 ## 88-76-8 Pentachlorophanol 20 ## 88-76-8 Pentachlorophanol 20 ## 88-76-8 Pentachlorophanol 20 ## 88-76-8 Pentachlorophanol 20 ## 88-76-8 Pentachlorophanol 20 ## 88-76-8 Pentachlorophanol 20 ## 88-76-8 Pentachlorophanol 20 ## 88-76-8 Pentachlorophanol 20 Pentachlorophanol						Hexachlorobenzene	20.
## 78-59-1 Hophorone 20 18-85-01-8 Prenanthrane 20 20 21 20-12-7 Anthracene 20 21 20-12-7 Anthracene 20 20 21 20-12-7 Anthracene 20 20 20 20 20 20 20 2						Pentachiorophenol	2021
STA 88-75-5 2-Nitrophenol DOM STB 120-12-7 Anthracene DOM STB 84-74-2 Di-n-Burylphthalate DOM STB 84-74-2 Di-n-Burylphthalate DOM STB 84-74-2 Di-n-Burylphthalate DOM STB 84-74-2 Di-n-Burylphthalate DOM STB 84-74-2 Di-n-Burylphthalate DOM STB 82-87-5 Senzidine DOM STB 82-87-5 Senzidine DOM STB 120-83-2 2-4-Dichlorophenol DOM STB 83-68-7 Surylbenzylphthalate DOM STB 83-68-7 Surylbenzylphthalate DOM STB 83-68-7 Surylbenzylphthalate DOM STB 83-68-7 Surylbenzylphthalate DOM STB 83-68-7 Surylbenzylphthalate DOM STB 83-68-7 Surylbenzylphthalate DOM STB 83-68-7 Surylbenzylphthalate DOM STB 83-68-7 Strylbenzylphthalate DOM STB 83-68-7 Surylbenzylphthalate DOM STB 83-88-7 Surylbenzy						Phenanthrene	20 u
34A 105-67-9 2.4-Dimethylphenol 3DM 58 84-74-2 Di-n-Burylphthalate 20 65-85-0 Benzoic Acid 2QM 58 206-44-0 Fluoranthane 20 438 111-91-1 bisi-2-ChloroethoxylMethane 20 M 58 82-87-5 Benzidine 20 58 82-87-5 Benzidine 20 58 82-87-5 Benzidine 20 58 82-87-5 Benzidine 20 58 82-87-5 Benzidine 20 58 82-87-5 Benzidine 20 58 82-87-5 Benzidine 20 58 82-87-5 Benzidine 20 58 81-82-1 1, 2, 4-Trichlorobenzane 20 M 58 85-68-7 Burylbenzylphthalate 20 58 81-82-1 1, 2, 4-Trichlorobenzane 20 M 58 85-68-7 Burylbenzylphthalate 20 M 58 85-68-7 Burylbenzylphthalate 20 M 58 87-88-3 Heisenbioroburadiene 20 M 58 86-55-3 Benzidia 20 M 58 87-88-3 Heisenbioroburadiene 20 M 58 86-55-3 Benzidia 20 M 58 87-88-3 Heisenbioroburadiene 20 M 58 817-88-0 Di-n-Octyl Phthalate 20 M 58 87-88-0 Chrysene 20 M 58 88-06-2 24 6-Trichlorobenol 20 M 58 817-84-0 Di-n-Octyl Phthalate 20 M 58 80-32-8 Benzidia 1					73 120-12-7	Anthracene	20.
65-85-0 Benzoic Acid 20 36 206-44-0 Fluoranthene 20 35 32-87-5 Benzidine 20 35 32-87-5 Benzidine 20 36 120-83-2 2 4-Dichlorophenol 20 36 129-00-0 Pyrane 20 37 31-Dichlorophenol 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 129-00-0 Pyrane 20 38 117-81-7 Pyrane 20 38 117-81-7 Pyrane 20 38 117-81-7 Pyrane 20 38 117-81-0 Pyrane 20 Pyra					LTS 84-74-2	Di-n-Butylphthalate	20 m
#38 111-91-1 bisl-2-ChloroethoxyMethane 20 M 58 92-87-5 Benzidine 20 M 120-83-2 2 4-Dichlorophenol 20 M 129-00-0 Pyrane 20 M 129-00-0 Pyrane 20 M 120-82-1 1, 2, 4-Trichlorobenzane 20 M 128-68-7 Butytbenzylphthalate 20 M 105-47-8 4-Chloroeniline 20 M 105-47-8 4-Chloroeniline 20 M 105-47-8 4-Chloroeniline 20 M 117-81-7 bisl2-EthylhasylPhthalate 20 M 117-81-7 bisl2-EthylhasylPhthalate 20 M 117-81-7 bisl2-EthylhasylPhthalate 20 M 117-81-6 2-Methylphenol 20 M 117-84-0 Di-n-Octyl Phthalate 20 M 117-84-0 Di-						Fluoranthene	20m
120-83-2 2 4-Dichlorophenol 20 m 129-00-0 Pyrane 20 m 120-82-1 1, 2, 4-Trichlorobenzane 20 m 128 85-68-7 Butytbenzylphthalaie 30 m 3, 3-Dichlorobenzidine 30 m 105-47-8 4-Chlorophiline 20 m 748 56-55-3 Benzo(a)Anthracene 32 m 105-47-8 4-Chlorophiline 20 m 30 m 117-81-7 bia/2-EthylharyliPhthalaie 32 m 31-57-68-3 Hexachlorobutadiene 20 m 30 m 117-81-7 bia/2-EthylharyliPhthalaie 32 m 31-57-6 2-Methylphenol 20 m 30 m 117-84-0 Di-n-Octyl Phthalaie 32 m 31-57-6 2-Methylphenol 20 m 3 m 117-84-0 Di-n-Octyl Phthalaie 32 m 32						Benzidine	20m
120-82-1 1, 2, 4-Trichlorobenzene 20 M LTR 25-68-7 Butylbenzylphthalate 20 M RS 91-20-3 Naphthalene 20 M RS 91-94-1 3, 3-Dichlorobenzidine 24 Marchlorobenzidine 20 M RS 91-94-1 3, 3-Dichlorobenzidine 24 Marchlorobutadiene 20 M RS 56-55-3 Benzo(a)Anthracene 24 Marchlorobutadiene 20 M RS 117-81-7 bis/2-EthylhexylPhthalate 24 Marchlorobutadiene 20 M RS 218-01-9 Chrysene 24 Marchlorobutadiene 20 M RS 218-01-9 Chrysene 24 Marchlorobutadiene 20 M RS 218-01-9 Chrysene 24 Marchlorobutadiene 20 M RS 218-01-9 Chrysene 24 Marchlorobutadiene 20 M RS 218-01-9 Chrysene 24 Marchlorobutadiene 20 M RS 218-01-9 Chrysene 24 Marchlorobutadiene 20 M RS 205-95-2 Benzo(b)Fluoranthene 24 Marchlorobutadiene 20 M RS 205-95-2 Benzo(b)Fluoranthene 24 Marchlorobutadiene 20 M RS 207-08-9 Benzo(a)Fluoranthene 24 Marchlorobutadiene						Pyrone	201
### 91-20-3 Naphthalene ### 91-94-1 3.3-Dichlorocenzidine ### 91-94-1 3.3-Dichlorocenzidine ### 91-94-1 3.3-Dichlorocenzidine ### 91-94-1 3.3-Dichlorocenzidine ### 91-94-1 3.3-Dichlorocenzidine ### 91-94-1 3.3-Dichlorocenzidine ### 91-94-1 3.3-Dichlorocenzidine ### 91-94-1 3.3-Dichlorocenzidine ### 91-94-1 3.3-Dichlorocenzidine ### 91-94-1 3.3-Dichlorocenzidine ### 91-94-1 3.3-Dichlorocenzidine ### 91-94-1 3.3-Dichlorocenzidine ### 91-94-1 3.3-Dichlorocenzidine ### 91-94-1 3.3-Dichlorocenzidine ### 91-94-1 91-94-		120-83-2				Butylbenzylphthalate	المرصد
106-47-8 4-Chlorophiline 20M 748 56-55-3 Benzola Anthracene 24 87-88-3 Hesachiorophitadiene 20M 117-81-7 bis/2-Ethylhexyl Phthalate 24 117-81-7 bis/2-Ethylhexyl Phthalate 24 117-81-6 2-Methylphenol 20M 128-01-9 Chrysene 24 117-84-0 Di-n-Octyl Phthalate 24 117-84-0						3. 3'-Dichlorobenzidine	204
### 205-95-2 BenzolbFluoranthene 20 Fig. 205-95-2 BenzolbFluoranthene 24 Fig. 218-01-9 BenzolbFluoranthene 24 Fig. 218-01-9 BenzolbFluoranthene 24 Fig. 218-01-9 BenzolbFluoranthene 24 Fig. 205-95-2 BenzolbFluoranthene 24 Fig. 205-95-2 BenzolbFluoranthene 24 Fig. 205-95-2 BenzolbFluoranthene 24 Fig. 205-95-2 BenzolbFluoranthene 24 Fig. 205-95-2 BenzolbFluoranthene 24 Fig. 205-95-2 BenzolbFluoranthene 24 Fig. 205-95-2 BenzolbFluoranthene 24 Fig. 205-95-3 BenzolbFluoranthene 24 F	419	106.47.8			718 56-55-3	Benzola Anthracene	70,1
1.67-6 2-Methylphenol 20 M						bist2-EthylhesylPhthalate	204
91-67-6 2-Methylnaphthalene 20 M 17-84-0 Di-n-Octyl Phthalate 24 25-95-2 Benzolb Fluoramhene 24 21 BE-06 2 2 4 6-Trichlorophenol 20 M 755 207-08-9 Benzolb Fluoramhene 24 25-95-4 2 4 5-Trichlorophenol 20 M 755 207-08-9 Benzolk Fluoramhene 24 25-95-4 2 4 5-Trichlorophenol 20 M 755 207-08-9 Benzolk Fluoramhene 24 25-95-4 2 4 5-Trichlorophenol 20 M 755 207-08-9 Benzolk Fluoramhene 24 25-95-4 2 4 5-Trichlorophenol 20 M 755 207-08-9 Benzolk Fluoramhene 24 25-95-4 2 4 5-Trichlorophenol 20 M 755 207-08-9 Benzolk Fluoramhene 24 25-95-4 2 4 5-Trichlorophenol 20 M 755 207-08-9 Benzolk Fluoramhene 24 25-95-4 2 5-50-20-20-20-20-20-20-20-20-20-20-20-20-20						Chrysene	20 m
338 77-47-4					117-84-0	Di-n-Doryl Phthalate	2011
21A BE-06 2 2 4.6-Trichlorophenol 20 µ 754 207-08-9 Benzolk Fluoranthene 24 95-95-4 2 4 5-Trichlorophenol 20 µ 754 50-32-8 Benzola Pyrene 20 15-58 7 2-Chloropaphthalene 20 µ 754 193-39-5 Indenol 2.3-cd Pyrene 24 193-30-5 Indenol 2.3-cd Pyrene 24 193-30-5 Indenol 2.3-cd Pyrene 24 193-30-5 Indenol 2.3-cd Py	1.				244 205-99-2	Benzolb/Fluoranthene	20,4
95-95-4 2 4 5-Trichlorophenol 20M 944 50-32-8 BenzotalPyrane 2.0 20M 945-95-4 2 4 5-Trichlorophenol 20M 945 193-39-5 Indeno(1, 2, 3-cd)Pyrane 7.0 20M 945-95-4 2 4 5-Trichlorophenol 20M 945-95-32-8 BenzotalPyrane 7.0 20M 945-95-4 2 4 5-Trichlorophenol 20M 945-95-32-8 BenzotalPyrane 7.0 20M 945-95-4 2 4 5-Trichlorophenol 20M 945-95-32-8 BenzotalPyrane 7.0 20M 945-95-4 2 4 5-Trichlorophenol 20M 945-95-32-8 BenzotalPyrane 7.0 20M 945-95-4 945-95-95-95-95-95-95-95-95-95-95-95-95-95					7.54 207-08-9	Benzolk /Fluoranthene	20 m
102 91-58 7 2-Chloronaphthalene 204 1 318 193-39-5 Indeno(1, 2, 3-cd)Pyrene 72		·			PM 50-32-8	Benzoraltyrene	204
					793-39-5	Indeno(1, 2, 3-cd)Pyrene	70 M
		BE 74-4	2-Naroaniline	20M	916 E 3-70-3	Dibenzia hAnthracene	204
FIR 131-11-3 Dimetryl Phihalate 20 M 191-24-2 Benzolp h, iParylane 2	-			3		Benzo(p h. IPerylene	20 m
#38 206 96.8 Acensphinwiene 20m						·	
95.05 2 3. histopaniline 20 1 11 (11+Cannot be separated from aphenylamine				· 20 m 1	dt-coma po	separated from sliphernylamine	

71

4/84

Sample Number CA 5/1

Organics Analysis Data Sheet (Page 3)

Pesticide/PCBs

Ca	oncentration	Low Medium				
Date Extracted Prepared 6-25-85						
		7 3-85				
	ste Analyzed	4:1 =1				
. c	onc/Dil Facti	or. <u>- ar-</u>	(No. 170)			
	CAS Number		(Circle One)			
m1 F	319.84.6	Alpha-BHC	0.12			
103"	319-85-7	Beta-BHC	0.1			
	319.86 8	Delta-BHC	0.1 11			
	58-89 9	Gamma-BHC (Lindane)	0. W			
100	76-44-8	Heptachlor	0.12			
	309-00-2	Aldrin	0.1/			
	1024-57-3	Heptachlor Epoxide	0.1 11			
<u> </u>	959 98-8	Endosultan I	0.1 11			
30 P	60 57-1	Dieldrin	011 1			
	72-55-9	4 4 .DDE	· 0. /i			
44 6	72-20-B	Endrin	0.1			
	33213-65-9	Endosulfati li	0,12.			
4 46	72.54.B	4 4 -000	0.1 1			
	7421-93-4	Endrin Aldenyde	0.1 2.			
_	1031-07-8	Endosultan Sulfate	0.1 2			
	50-29-3	4.4 -DDT	0.1 11			
	72-43-5	Methoxychlor	0.2·M			
	53494.70.5	Endrin Kalone	0.1 11			
9.	57.74.5	Chiprosne	0.20			
	P8001-35-2	Totaphene	0.2 M			
113	12674-11-2	Arocior-1016	0.2 11			
103	111104-28	Aroclor-1221	0.24			
	11141-16-	Aroclor-1232	0.2 N			
16.	r53469-21-	Arocior-1242	0.21			
ופנ	+ 12672·29·		0.2 M			
	11097.69		0.2 L			

.. V = Volume of extract injected (ul)

Aroclot-1260

V_B = Volume of water extracted (ml)

W_s = Weight of sample extracted (g)

Vt = Volume of total extract (ul)

	-40	NA	v. 5∞	v 2.7
.,	500	 WWNA	V ₁	, , ,

E	אינא פינו יביר אבר שכן	בל 6 ביו שלייל קרו השלים ביים או	Dutilitée
E MALLES LINE IN			
P D Box 818	Weste Uping Alibin	W 22313 703 /\$57-2490	

⇒ amp+e	ישטוחטפי
TA5	20

Organics Analysis Data Sheet (Page 1)

REA 115
71 . 185
811/85
0'

Laboratory Name ERCO/A Division of ENSECO	Case No 4565
17214	OC Report No
Sample Marrix Water	Contract No68-01-7027
Data Release Authorized By	Date Sample Received 6/24/85

Volatile Compounds

· • • • • • • • • • • • • • • • • • • •	
Concentration Low Medium (Circle One) Date Extracted/Prepared 7-5-85	& VUA Chromatogram and Quant Report
	for 7/1/85 included
Date Analyzed 7-5-85	tor 1/1/15 man
Conc/Dil Factor	for time criteria taly
Percent Moisture	
Percent Moisture (Decanted)	

		ABICALLI MIDISTOLE (DODGE				
	CAS Number	•	(Circle One)			
۱, ا	74-87-3	Chloromethane	10 m J			
.0	74-83-9	Bromomethane	10 11			
U	75.01-4	Vinyl Chloride	10 M 1			
U		Chloroethane	10.1			
טאי	75-09-2	Methylene Chloride	10 m 1			
	67-64 1	Aceione	25M			
	75-15-0	Carbon Disuffide	10 M			
ں ج	75-35-4	1.1-Dichloroethene	100			
U	75-34-3	1. 1-Dichloroethane	10 4			
J.	156-60-5	Trans 1, 2-Dichloroethene	104			
	67-66-3	Chlordorm	104			
1	107-06-2	1, 2-Dichloroethane	10 4			
	78-93-3	2-Butanone	104			
NU	71-55-6	1 1,1-Trichloroethane	100			
E v	1	Carbon Tetrachloride	104			
ľ	108-05-4	Viny! Azerere	104			
	75.27-4	Bromodichloromethane	10 W Y			

	CAS Number	(ug Tor ug Kg (Circk One
30	79-34-5	1 1, 2 2-Tetrachiprocthane	10 M T
170	78-27-5	1, 2-Dichloropropane	10 m
130	100€1-02-€	Trans 1, 3-Dichloropropene	100
170		Trichloroethene	10 4
510	124-46 1	Dibromochloromethane	10.4
	79-00-5	1, 1, 2-Trichloroethane	101
40	71.43 2	Benzene	10m
	10051-01-5	cis 1, 3-Dichloropropent	10m
190	110-75-8	2.Chioroethylvinylethe	100
470	75-25-2	B-omotorm	100
	591-78-6	2-Heishone	100
	108 10 1	4-Methyl-2-Pentanone	10 4
250	127-16-4	Tetrachioroethene	10 11
860	106-BE 3	Toluene	10u
70	106 90.7	Chlorobenzene	104
370	+	Ethylbenzene	1011
<u> </u>	100-42-5	Siviene	100
1		Tota: Kylenes	10 m

Date Reserving Qualifort

For reporting results to EPA the february species qualifiers are used debinional flags or featuress explaining results are encouraged. However, the definition of each flag must be explicit.

- Make If the result is a value greater than at aqual to the direction land, against the value.
- Bedicates compound and produced for but not detected Expain the communications from the go particle with the U to g. 10UI beard on recordability compounds on desection tend. The common product mad U. Commond and produced for but not desected. The terrors as the recommon advantage desection tend for the compose.
 - Subcases on assumpted to be. The Reg is used orthor when assumering a personners for sensornerly personner company and sensors at 1 separation is assumed or other the most sensors the about the property of a sempound that ments the about Acaston treated but the result is test than the sensors dead devection and but

- This has been as posterior personance where the attentional has been performed by GC 'MS. Single automatent posterior 210 ng. of the final exists about be confirmed by GC 'MS.
- This flog is send when the analyse is found in the bunk as used at a service. It indicates possible (probable beans companies and morns the data year to that deprise the action.
- Other specific flags and feathers may be required to present define the require. If used they must be fully directioned and such description processed to the details guinney report.
- N. Indicates compound was detected and identified, but the concentration is below reporting detection limit.

Environmental Protection Agency. CLP Sample Management Office P. D. Box 818. Alexandria Virginia 22313 703/857-2490 Sample Number

JA520

REL 8 117/85

Organics Analysis Data Sheet (Page 2)

Semivolatile Compounds

	Medium (Circle One)
Date Extracted / Prepare	d <u>7-7-85</u>
Date Analyzed	7-12-85
Coor /Dil Factor	2

			$\overline{}$	
	CAS Number	· (į	g/lerug/Kg (Circle One)	
 1	62.75.9	N-Nitrosodimethylamine	20 M J	_1
.	108-95-2	Pneno!	20 M	9
-50	62-53-3	Aniline	ابره	5
■ ⊶ •Ì	111-44-4	bis:-2-ChloroethyllEther	20 M	
24 4	95-57-8	2-Chiorophenol	20 M !	3
2.8	541-73-1	1 3-Dichlorobenzene	20 M i	¥
	106-46-7	1.4-Dichlorobenzene	30 M	2
<u> </u>	100-51-6	Benzyl Alcohol	20 M	=
256	95-50-1	1 2-Dichlorobenzene	20 u	2
	95-48-7	2-Methylphenol	20 n	Į .
428		bis/2-chloroisopropyliEther	20 v	1 :
	106-44-5	4-Methylphenol	20 m	∮
3 638	621-64-7	N-Nitroso-Di-n-Propylamine	202	
178	67-72-1	Hexachloroethane	202	1:
حدد. هنۍ	98-95-3	Nitrobenzene	20 m	٤ إ
== 5×6	78-59-1	Hophorane	20 n	1:
57 A	88.75.5	2-Nitrophenol	20 m]:
344		2 4-Dimethylphenol	20m	4 4
	65-85-0	Benzoic Acid	20 M	4 8
42	111-91-1	bist-2-ChloroethoxyMethane		┨.
<u>عد</u> ايو		2.4-Dichlorophenol	20 n	٦,
نے۔ 10 ا	120 82 1	1, 2, 4-Trichlorobenzene	20 M	. إ
44	01.30.3	Naphthalene	20 M	4
	106-47-8	4-Chloroaniline	20 m	Ц:
- 51	6 87-68-3	Hexachlorobutadiene	20 M	Ц
9.1	59-50-7	4-Chloro-3-Methylphenol	70M	Ц
67.	91-67-6	2-Methylnaphthalene	204	Ц
_ <<	8 77-47-4	Hexachlorocyclopemadiene	20 M	4
2	20.00.3	2 4 6-Trichlorophenol	20 M	Ц
	95-95-4	2, 4, 5-Trichlorophenol ,	7.0 M	Щ
_ *	91-58 7	2-Chloronaphthalene	70 n	4
_	88-74-4	2-Naroaniline	20 M	4
3	18 131-11-3	Dimethyl Phthalate	N 02	뷔
	£ 208 95·8	Acenaphthylene	20 M	#
I	99-09-2	3-Naroaniline	20 M	لـ
		•		

18 83-32-9 Acenaphthene 20 5AA 51-28-5 2,4-Dintropheno! 20 5EA 100-02-7 4-Nitropheno! 20 132-64-9 Dibenzofuran 20 35 121-14-2 2,4-Dintrotoluene 20 3LA 606-20-2 2 6-Dintrotoluene 20 No884-66-2 Diethylphthalate 20 No86-73-7 Fluorene 20 100-01-6 4-Nitroeniline 20 LOA 534-52-1 4,6-Dinitro-2-Methylphenol 20	
SAA 51-28-5 2,4-Dintropheno! 20 5e4 100-02-7 4-Nitropheno! 20 132-64-9 Dibenzofuran 20 3st 121-14-2 2,4-Dintrotoluene 20 124 606-20-2 2 6-Dintrotoluene 20 108 84-66-2 Diethylphthalate 20 405 7005-72-3 4-Chlorophenyl-phenylether 20 100-01-6 4-Nitrosniline 20 4-6-Dinitro-2-Methylphenol 20	
SEA 100-02-7 4-Nitrophenol 20 132-64-9 Dibenzofuran 20 35121-14-2 2,4-Dintrotoluene 20 34 606-20-2 2 6-Dintrotoluene 20 405 7005-72-3 4-Chlorophenyl-phenylether 20 405 86-73-7 Fluorene 20 100-01-6 4-Nitroeniline 20 4-6-Dinitro-2-Methylphenol 20	
132-64-9 Dibenzofuran 20 / 35t 121-14-2 2.4-Dinitrotoluene 20 / 3.4 606-20-2 2 6-Dinitrotoluene 20 / 3.4 606-20-2 2 6-Dinitrotoluene 20 / 3.4 66-2 Diethylphthalate 20 / 3.4 7005-72-3 4-Chlorophenyl-phenylether 20 / 3.4 86-73-7 Fluorene 20 / 3.4 52-1 4.6-Dinitro-2-Methylphenol 30 / 3.4 52-1 4.6-Dinitro-2-Methylphenol 30 / 3.4 52-1 4.6-Dinitro-2-Methylphenol 30 / 3.4 52-1 4.6-Dinitro-2-Methylphenol 30 / 3.4 52-1 4.6 Dinitro-2-Methylphenol 30 / 3	M M M M M M M M M M
314 606-20-2 2 6-Dinitrotoluene 20 408 84-66-2 Diethylphthalate 20 408 7005-72-3 4-Chlorophenyl-phenylether 20 30 86-73-7 Fluorene 20 100-01-6 4-Nitroaniline 20 4-6-Dinitro-2-Methylphenol 20	4 4 4 4 4 4 4 4 4 4
114 606-20-2 2 6-Dinitrotoluene 30 106 84-66-2 Diethylphthalate 20 105 7005-72-3 4-Chlorophenyl-phenylether 30 100 86-73-7 Fluorene 30 100 01-6 4-Nitroeniline 20 104 534-52-1 4-6-Dinitro-2-Methylphenol 20	и <u> </u>
No.884-66-2 Diethylphthalate 20 4057005-72-3 4-Chlorophenyl-phenylether 20 50586-73-7 Fluorene 20 100-01-6 4-Nitroeniline 20 604 534-52-1 4-6-Dinitro-2-Methylphenol 20	м <u> </u> и
100-01-6 4-Nitroeniline 20, 604 534-52-1 4, 6-Dinitro-2-Methylphenol 20,	и и
100-01-6 4-Nitroeniline 20 604 534-52-1 4, 6-Dinitro-2-Methylphenol 20	и
100-01-6 4-Nitroeniline 20 LoA 534-52-1 4, 6-Dinitro-2-Methylphenol 20	и
618 86-30-6 N-Nitrosodiphenylamine (1) 20	<u> </u>
41B 101-55-3 4-Bromophenyl-phenylether 20	
98 118-74-1 Hexachlorobenzene 80 A	4
644 87-86-5 Pentachioropheno! 20	<u>~</u>
91585-01-8 Phenanthrene 20	<u>~</u>
715 120-12-7 Anthracene 20	
645 84-74-2 Di-n-Butylphthalate 20	
PA 206-44-0 Fluoranthene 26	
55 92-87-5 Benzidine 20	<u>u </u>
915 129-00-0 Pyrene 20	
674 85-68-7 Burylbenzylphinalate 20	4
3.3-Dichlorobenzidine	4
716 56-55-3 BenzolalAnthracene 20	4
648 117-81-7 bis/2-EthylhesylPhthalate 20	4
748 218-01-9 Chrysene 20	4
117-84-0 Di-n-Octyl Prihalate 20	المر
345 205-99-2 Benzolb/Fluoramhene 20	<u> </u>
156 207-08-9 Benzalk Fluorammene 20	<u> </u>
7 M 50-32-8 Benzola Pyrene 20	1/21
193 39-5 Indeno(1, 2, 3-od)Pyrene 20	4
	>,4
191-24-2 Benzolo h. IPerylene 20	m V

(1)-Cannot be separated from diphenylamine

JA520

Organics Analysis Data Sheet (Page 3)

Pesticide/PCBs

Concentration	: (Low) Medium	(Circle One)			
Date Extracted/Prepared 6-24-85					
Date Analyzed	7-3-85				
Conc/Dil Fact	or dil=1				
CAS		Por ug /Kg			
Number		(Circle One)			
101 319.84.6	Alpha-BHC	0.1 115			
1034 319-85-7	Beta-BHC	0.1			
19-86-8	Delta BHC	0.1 11			
10:158-89-9	Gamma-BHC (Lindane)	0.1 1			
100 176.44.8	Heptachlor	012			
39 P 309 · 00 · 2	Aldrin	1 01 1			
101 - 1024 57-3	Heptachior Epoxide	0.1 11			
959 98.8	Endosultan I	0.1 41			
96P 60-57-1	Dieldrin	0.1 11			
93P 72-55-9	4 4 -DDE	0.1			
72.20.B	Endrin	0.1 M!			
33213-65-9	Endosulfan li	10/41			
94P 72-54-8	4 4 .000	0.1 2011			
7421.93.4	Endrin Aldehyde	0.1 11			
97 / 1031-07-8	Endosulfan Sulfate	0.1 11			
91/50-29-3	4.4 ·DDT	0.1 11			
72-43-5	Methoxychlor	0.2 11			
53494.70.5	Endrin Ketone	0.1 4			
917 57.74.9	Chlordane	0.2 W			
113 1 8001-35-2	Toxaphene	0.2 M			
117 12674-11-2		1012 U			
101/11104-28-2	Aroclor-1221	0.2 M			
109111141-16-5	Aroclor-1232	0.2 K			
100H53469-21-8	Arocior-1242	0.2 11			
110 P 12672-29-6	Arocior-1248	0.2 M			
107/11097-69	Aroclor-1254	0.2 4			
111005 87.1	Arccior-1260	0.2 MY			

V₄ × Volume of extract injected (ul)

V_B = Volume of water extracted (ml)

W_g = Weight of sample extracted (g)

V₁ = Volume of total extract (ul)

			640	2.7
•	500	aw NA	V. 300	V
v		6 W		•

Organics Analysis Data Sheet

-		<i>'</i> '	(Pag	e 1)			
د د	b Sample ID I Imple Matrix:	No 17212 Water Withorized By JAM		Co Di	C Report No ontract No _ ate Sample R	4565 140 68-01-7027 leceived6/24/85	
		Date Extra Date Anal Conc/Dil	tion: Low cred/Prepared yzed Factor loisture:		7-1-85 7-1-85	•	112185
	CAS Number	Percent M	loisture (Decan ug/for ug/Kg (Circle One)	•	CAS Number		ug /l)or ug /Kg (Circle One)
_		Chioromethane	10 M		79-34-5	1, 1, 2, 2-Tetrachloroethane	10 M
! ,†		Bromomethane	101		76.87.5	1, 2-Dichloropropane Trans 1, 3-Dichloropropene	10 m
-U	75-01-4	Vinyl Chloride	1011		100£1-02-E	Trichloroethene	10 M
		Chloroethane	1011		79-01-6	Dibromochloromethane	10 M
		Methylene Chloride	10 M		124-4E 1	1, 1, 2-Trichloroethane	10 4
一	67-64-1	Acetone	25M		79.00.5	Benzene	10 M
	75-15-0	Carbon Disulfide	10 M	40	71-43-2	cis.1, 3-Dichloropropene	10 4
hυ	75-35-4	1, 1-Dichloroethene	101		10051-01-5	2-Chloroethylyinylether	10 M
134	75-34-3	1, 1-Dichloroethane	10 M		110-75-8	Bromoform	10 M
٥υ	156-60-5	Trans-1, 2-Dichloroethene	10 M	440	75-25-2 591-78-6	2-Hexanone	10 %
_	67-66-3	Chloroform	10 11		108 10-1	4-Meinyl-2-Penianone	10 M
100	107-06-2	1, 2-Dichloroethane	10 M	ا د	127-16-4	Tetrachioroethene	10 10
	78-93-3	2-Butanone	104	·	106-8E 3	Toluene	10.4
יו	71-55-6	1, 1, 1-Trichloroethane	100		108 90-7	Chiprobenzene	10 4
6 0	56-23-5	Carbon Tetrachloride	10 M		100.41.4	Ethylbenzene	10 M
	108-05-4	Vinyl Acetate	10u	1 52.	100.11.1	- Control of the Cont	10.4

Data Resorting Dystriats

10 L

100-42-5

Styrene

Total Xylenes

For responsing results to EPA, the following results qualifiers are used Additional Rays or feathories explaining results are encouraged However, the defination of each flag must be explicit

If the specific is a value greater than or equal to the descript and report the value

Bromodichloromethane

108-05-4

75.27-4

- Badicanes surgeared was profused for but not denoted Report the minimum detection limit for the sample with the U is § 10U) based on recessary concernsion " Sharen actions (The is not recovering the matrument Conscion terms .) The feathers should road U Compound was prolysed for but not detected. The Secretary at the management and indicate desection benefit for ---
 - Busicenes on extrement value. This Reg is used enther setion betimeting a parcentration for sematine ly Minmified compounds where a 1 1 response is sexumed gr when the mess spectral data indicates the presence of a compound that meets the eleminication cineral but the result is test then the specified direction limit but .

- This had applies to posticide parameters where the elentrication has been confirmed by GC 'MS. Single germonent post-critics ≥10 ng. of in the final estract provid be confirmed by GC 7MS
- This flag is used when the profite it found in the blank da well as a sample & indicates possible (probable Beens contemmention and worns the Bets weer to take SHOP HE WITHOUT

Differ Differ specific flags and feathers may be required to grapetly define the results if used they must be fully Elescritised and such description attached to the data ושפון נישריים

K. Indicates compound was detected and identified, but the concentration is below reporting detection limit.

96

Form I

4/84

10 M

Environmental Protection Agency, CLP Sample Management Office, P. O. Sca 818. Alexandria, Virginia 22313 703/857-2490

Sample Number JA521

Organics Analysis Data Sheet (Page 2)

Semivolstile Compounds

*Concentration: (Low) Medium (Circle One) Date Extracted/Prepared: ___ Conc/Dil Factor: _

_	CAS Number	(ug/lor ug/Kg (Circle One)		CAS Number		ug/Ibr ug/Kg (Circle One)
	62-75-9	N-Nitrosodimethylamine	20 M J		83-32-9	Acenaphthene	30 n.T
-11	108-95-2	Phenol	20 M 1	594	51-28-5	2, 4-Dintrophenol	20 M
-(2)	62-53-3	Aniline	20 M	584	100-02-7	4-Nitrophenol	26 11
	111-44-4	bisi-2-ChloroethyllEther	20 M		132-64-9	Dibenzoluran	2011
	95-57-8	2-Chlorophenol	20M		121-14-2	2, 4-Dinstrotoluene	20 m
247	541.73.1	1.3-Dichlorobenzene	20.M		606-20-2	2.6-Dinitrotoluene	20 M
252	106 45.7	1 4-Dichlorobenzene	20ml	200	84-66-2	Diethylphthalate	20 m
12 7 B	106-46-7	Benzyl Alcohol	20 n l	404	7005-72-3	4-Chlorophenyl-phenylether	20 M
	95-50-1	1, 2-Dichlorobenzene	20 u	200	86-73-7	Fluorene	204
136	95-48-7	2-Methylphenol	20 M		100-01-6	4-Nitroaniline	20 M
	39538 32.9	bis/2-chloroisopropyl)Ether	20 M	LOA	534-52-1	4, 6-Dinitro-2-Methylpheno	
718	106-44-5	4-Methylphenol	20 M I	628	86-30-6	N-Nitrosodiphenylamine (1)	
		N-Nitroso-Di-n-Propylamine	20 m	418	101-55-3	4-Bromophenyl-phenylethe	
	621-64-7	Hexachloroethane	20 M	78	118-74-1	Hexachiorobenzene	20 M
128		Nitrobenzene	20 M	6414	87-B6-5	Pentachlorophenol	20 M
مند	98.95.3	isophorone	20 M	31E	85-01-8	Phenanthrene	20 M
250	78-59-1	2-Nitrophenol	20 W	775	120-12-7	Anthracene	20 M
	88-75-5 105-67-9	2.4-Dimethylphenol	20 m	675	84-74-2	Di-n-Butylphthalate	20 M
347	65-85-0	Benzoic Acid	20 M	378	206-44-0	Fluoranthene	20 h
	1111	bist-2-ChloroethoxyMethan	20 A	53	92-87-5	Benzidine	2011
47	120 02 2	2. 4-Dichlorophenol	20 M	745	129-00-0	Pyrene	20 M
يع ا	1.00.00	1, 2, 4-Trichlorobenzene	20 M	674	35-68-7	Butylbenzylphthalate	20 10
3.5		Naphthalene	20 M	7 74	91-94-1	3, 3'-Dichlorobenzidine	1 20 m
E	91-20-3	4-Chiorpaniline	20 M	72	56-55-3	Benzo(a)Anthracene	20 M
		Hexachiorobutadiene	20,4	1 4	117-81-7	bis(2-Ethylhexyl)Phthalate	20 M
	87-68-3	4-Chloro-3-Methylphenol	20 M	1	218-01-9	Chrysene	20 m
216		2-Methylnaphthalene	20 M	\prod_{n}	8117-84-0	Di-n-Octyl Phthalate	201
	91-57-6 R 77-47-4	Hexachlorocyclopemadiene	20 س	7 74	205-99-2	Benzo(b)Fluoranthene	20 H
33		2.4.6-Trichlorophenol	20 M	75	207-08-9	Benzo(k)Fluoranthene	2011
31	95-95-4	2.4.5-Trichlorophenol	20 M	1	50-32-8	Benzo(a)Pyrene	20 M
	\$ 91.58.7	2-Chloronaphthalene	20 M] 33	ah 93.39.5	Indeno(1, 2, 3-od)Pyrene	20 M
	B8-74-4	2-Naroaniline	20 M	T +2	8 53.70.3	Dibenzia, hjAnthracene	70 M
-	8 131-11-3	Dimethyl Phthalate	20 ju		5 191-24-2	Benzolo h, iPerylane	20 M
		Acenaphinviene	· 20 M				
3:	99.09 2	3-Nitroaniline	20 M	لــُـ	(1)-Cannot be	separated from diphenylamine	

.07.

4/84

Environmental Protection Agency, CLP Sample Management Office, P. D. Box 818. Alexandria Virginia 22313-703/557-2490

Sample Number

JA 5Z/

Organics Analysis Data Sheet (Page 3)

Pesticide/PCBs

C	oncentration.	Low Medium	(Circle One)					
Date Extracted/Prepared 6-25-85								
Di	sie Extracted	7-3-85						
D	ste Analyzed							
· C	onc/Dil Fact	or. <u>dil=1</u>						
CAS Number (Circle One)								
mir E	319-84-6	Alpha-BHC	0.12					
1034	319-85-7	Beta-BHC	0.1/1					
	319-86-8	Delta-BHC	0.1 11					
	58-89-9	Gamma-BHC (Lindane)	0.1 M					
100 P	76-44-B	Heptachlor	0.1 1					
	309-00-2	Aldrin	0.111					
	1024-57-3	Heptachior Epoxide	0.1 U					
	959-98-8	Endosulfan I	0.14					
	60-57-1	Dieldrin	0.1 14					
938	72-55-9	4 4 - DDE	0.1 11					
730	72-20-B	Endrin	0.1 M					
	33213-65-9	Endosultan II	01/4					
446	72-54-8	4 4 -DDD	0.1 4					
	7421-93-4	Endrin Aldehyde .	0.1 11					
97 6	1031-07-B	Endosullan Sullate	0.1 4					
911	50-29-3	4,4'-DDT	1 0.1 M					
	72-43-5	Methoxychior	0,2 M					
	53494.70.5	Endrin Ketone	0.1 1					
qif	57.74.9	Chlordane	0.2 u					
	8001-35-2	Tozaphene	0.2 M					
113	12674-11-2	Arocior-1016	0.2 M					
	11104-28-2	Aroclor-1221	012 4					
109	11141-16-5	Aroclor-1232	0.2 K					
101	r53469-21-8	Aroclor-1242	0.211					
777	12672-29-6	Arocior-1248	0.2 M					

V₄ * Volume of extract injected (ul)

Aroclor-1254

Aroclor-1260

11097-69-1

111 11096-82-5

V_S = Volume of water extracted (ml)

W_g = Weight of sample extracted (g)

Vt = Volume of total extract (ul)

			•	7	
		. (4	500	α· +	
	500	aw. NA	v. 500	V	
V_		0 W.		•	

Organics Analysis Data Sheet (Page 1)

_			(Pag	16 1)			
دا د	b Sample ID N mole Matrix:	ERCO/A Division o 17211 Water Thorized By		00	se No Report No _ intract No _ ite Sample R		5
ľ			Volatile Co				R(1) 185
	-	•	_	-		. 0001	7(1/2/1/2
_		Concentra	tion: (Low)	Med	inm (Cite)	e Une)	8/121
		Date Extra	med/Prepared		7-1-85		
•		Date Anal	yzed	7-	-1-85		
Ħ		9 tt 700	Tomas 1		ън		
		Constall	Factor.			•	
		Percent M	loisture				•
		Percent M	loisture (Decin	ted) .			_
	CAS		ug/Dor ug/Kg (Circle One)	_	:AS lumber		ug for ug /Kg (Circle One)
_	Number		104	الالا	79.34.5	1, 1, 2, 2-Tetrachioroethane	10 m
		nioromethane	104	370	78-87-5	1, 2-Dichloropropane	104
12		Invi Chioride	10 4	230	10061-02-E	Trans-1, 3-Dichloropropene	104
4	75.01-	thiorpethane	10 M		79-01-6	Trichloroethene	10 M
의	75.00.3	Aethylene Chloride	10.4	_	124-45 1	Dibromochloromethane	10m
140	75.03.2	cetone	25 M		79-00-5	1, 1, 2-Trichloroethane	104
• {	07-0-1	arbon Disullide	10 M	40	71-43-2	Benzene	10M
-		1-Dichloroethene	10 u	_	10051-01-5	cis-1, 3-Dichloropropent	100
	13.33-4	1.1-Dichloroethane	10 M		110-75-B	2-Chloroethylvinylethe.	1000
22		rans-1, 2-Dichloroethene	104	470	75-25-2	Bromoform	10 M
हिहि	67-66-3	Chlereform	1011		591.78.6	2-Hexanone	104
30	107-06-2	1. 2-Dichloroethane	10 u		108 10-1	4-Methyl-2-Pentanone	10 4
		2-Butenone	10 n		127-18-4	Tetrachioroethene	10 M
ייו		1, 1, 1-Trichloroethane	104		108-88 3	Toluene	10 10
ت ن م ل	56-23-5	Carbon Tetrachioride	10 11		106-90-7	Ethylbenzene	10 11
Ť	108-05-4	Vinyl Acetate	104	370	100-41-4	Siviene	Pu
170	75-27-4	Bromodichloromethane	Jon	}	100.42.3	Total Xylenes	1011
<u> </u>						I total wherea	

Data Reporting Qualifiers

For resorting results to EPA, the faltering results qualifiers are used. Additional flags or factionists explaining results are encouraged. However, the definition of each flag must be explicit.

war and the second

Makes If the result is a value greater than or equal to the descript hand, report the value

- Exercises compound uses brokened for but not derected flagors the terrement desection from for the complete with the U to g. 1(U) bound on reconstant components into the section actions (This is not reconstantly the matrument desection from 1). The feathers around road U. Compound uses analyzed for but not desected. The terrement as the recommunication and desection forms for the complete.
- d freehouse on an invested value. The flag is used arriver when estimating a concentration for constitutely also reflect compounds where a 1.1 response is assumed or when the meas assertful data reducates the presency of a compound that means the alternitication crimeria but the result is test than the specified desection bent but greater than zero. (e.g., 100)

- C. That has been as posticide parameter, where the specification has been confirmed by GC 1MS. Single component posticides ≥10 ng. of on the final extract phouse be confirmed by GC 1MS.
- B This flag is used when the analyse is found in the blank on well as a benger. It indicates possibly 'probably being contamination and warts the data user to take appropriate action.

Other specific flags and features may be required to presently define the results. If used they must be fully described and such description exacts to the detall summary report.

K Indicates compound was detected and identified, but the concentration is below reporting detection limit.

110

Form I

4/84

Sample Number

JA 522

Organics Analysis Data Sheet (Page 2)

R&L 8/12/65

Semivolatile Compounds

Concentration: Low Medium (Circle One)

Date Extracted/Prepared. 7-9-85

Date Analyzed 7-12-85

Conc/Dil Factor: 2

		ag/lorug/Kg		
	CAS Number	(Circle One)		
1 2	62-75-9	N-Nitrosodimethylamine	ZOME	1
	10000	Phenol	20 M I	5
70	62-53-3	Aniline	20 Mi	হ
	111-44-4	bist-2-ChloroethyllEther	20 M 1	
1	95-57-8	2-Chlorophenol	20 M	3
18	541-73-1	1, 3-Dichlorobenzene	20 M	34
	106-46-7	1.4-Dichlorobenzene	ZOM	*
	100-51-6	Benzyl Alcohol	20m	7
56	95-50-1	1. 2-Dichlorobenzene	20 m l	3
	95-48-7	2-Methylphenol	20 ml	
B	39638 32-9	bis(2-chloroisopropyl)Ether	20,	7
	106-44-5	4-Methylphenol	20 1	复
m 6		N-Nitroso-Di-n-Propylamine	20 M	1
	67-72-1	Hexachioroethane	20 M	=
4.B	98-95-3	Nitrobenzene	20 m	6
	1-2-52-4	Isophorone	20ml	2
A		2-Nitrophenol	20 M	I
340	1 2 2 2	2, 4-Dimethylphenol	20 M	یا
	65-85-0	Benzoic Acid	29 M	2
2		bist-2-ChloroethoxyMethane	20 M	
ابر ا بر		2. 4-Dichlorophenol	20 M	13
2	1120 82 1	1, 2, 4-Trichlorobenzene	20 M	1 5
	01 20 3	Naphthalene	20 M]
18	106-47-8	4-Chlorosniline	20,4] 2
-61	87-68-3	Mexachlorobutadiene	20 M]
1.4	-	4-Chloro-3-Methylphenol	20 M] ,
	91-57-6	2-Methylnaphthalene	20 M]
<u> </u>		Hexachlorocyclopertadiene	20 M] ;
	85-06-2	2.4.6-Trichlorophenol	20 M] :
<i>)</i>	95-95-4	2.4.5-Trichlorophenol	70 m] ;
	8 91-58-7	2-Chioronaphthalene	20 M]
	88.74.4	2-Nitroeniline	ا سر20]
Щ,	121-11-3	Dimethyl Phthalate	ر سر 20]
-	208-96-B	Acenaphthylene	20 m	
	99.09.2	3 Nitrospiline	20 M	
		•		_ , .

	CAS Number		(ug /l er ug /Kg (Circle One)
18	83-32-9	Acenaphthene	20MJ
	51-28-5	2. 4-Dintrophenol	20 M !
584	100-02-7	4-Nitrophenol	20 1
	132-64-9	Dibenzofuran	20 M
350	121-14-2	2.4-Dinstrotoluene	20 u 1
34.6	606-20-2	2 6-Dinitrotoluene	20 M
104	84-66-2	Diethylphthalate	20 u
40	7005-72-3	4-Chlorophenyl-phenylether	2011
306	86-73-7	Fluorene	20 11
	100-01-6	4-Nitroaniline	204
LOA	534-52-1	4, 6-Dinitro-2-Methylphenol	20 M
628	86· 3 0· 6	N-Nitrosodiphenylamine (1)	20 4
418	101-55-3	4-Bromophenyl-phenylether	20m
	118-74-1	Hexachiorobenzene	20 m
	87-86-5	Pentachlorophenol	20m 1
316	85-01-8	Phenanthrene	70 m
	120-12-7	Anthracene	20 M
625	84-74-2	Di-n-Butylphthalate	20M
778	206-44-0	Fluoranthene	20 M
	32-87-5	Benzidine	70 n
	129-00-0	Pyrene	10m
L7/	85-68-7	Butylbenzylphthalate	120m
77	91-94-1	3.3 -Dichlorobenzidine	20m
71	56.55.3	BenzolalAnthracene	200
	117-81-7.	bis(2-Ethylhexyl)Phthalate	120 M
	218-01-9	Chrysene	20 M
<u> </u>	8 117-84-0	Di-n-Octyl Phthalate	20
3 +	205-99-2	Benzo(b)Fluoranthene	20 M
75	207-08-9	Benzolk/Fluoranthene	2011
74	30-32-8	BenzocalPyrane	20 u
33	193-39 5	Indenoil, 2, 3-ediffrene	20 M
821	8 = 3.70.3	Dibenza, hiAnthracene	20 11
77	5 191-24-2	Benzo(p h. IPerylene	70 M 1

(1)-Cannot be separated from diphenylamine

Environmental Protection Agency, CLP Sample Management Office, P. D. Box 818, Alexandria Virginia 22313 703/557-2490

Sample Number

TA 522

Organics Analysis Data Sheet (Page 3)

Pesticide/PCBs

Concentration: Low Medium (Circle One)						
Date Extracted/Prepared 6-25-35						
D.	Date Analyzed 7-3-85					
· c	Conc/Dil Factor: dil 4					
-	CAS ug/forug/K					
	Number		(Circle One)			
1019	319-84-6	Alpha-BHC	0.1 4			
1030	319-85-7	Beta-BHC	0.1 11			
	319-86-8	Delta-BHC	0.1 11			
101	58-89-9	Gamma-BHC (Lindane)	0.1 M			
100 6	76-44-B	Heptachlor	0.1 11			
398	309.00.2	Aldrin	0.1 11			
101 6	1024-57-3	Heptachlor Epoxide	0.1 K			
	959-98-8	Endosulfan I	0.1 11			
90 P	60-57-1	Dieldrin	0.1 M			
938	72-55-9	4 4 DDE	0.1 M			
780	72-20-B	Endrin	0.1 ll			
-	33213-65-9	Endosulfan II	0.1 4			
946	72-54-8	4 4 -DDD	0.1 4			
796	7421-93-4	Endrin Aldehyde	0.1 M			
97 6	1031-07-B	Endosulfan Sulfate	0.1 11			
911	50-29-3	4 4'-DDT	0.1 U			
	72-43-5	Methoxychior	0.2 M			
	53494.70.5	Endrin Ketone	0.1 11			
916	57.74.9	Chiordane	0.2 11			
113 6	8001-35-2	Toxaphene	1 0.2 M			
1120	12674-11-2	Aroclor-1016	0.2 K			
1091	11104-28-2	Aroclor-1221	0.2 M			
	11141-16-5	Arocior-1232	0.2 K			
201	53469-21-9	Arocior-1242	0.2 11			
110	12672-29-6	Aroclor-1248	0.2 M			
	11097-69-1	Arocior-1254	0.2 4			
	11096-82-5	Arocior-1260	0.2 M			

V = Volume of extract injected (ul)

V_g = Volume of water extracted (ml)

W_g = Weight of sample extracted (g)

Vt = Volume of total extract (ul)

V.	500	or W.	WA	v, 500	v, 2.7	_
V.		~ ***		· · · · · · · · · · · · · · · · · · ·	•	

Organics Analysis Data Sheet

AK RI	1 185
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T ,		(Pag			81121
Laboratory N	ame ERCO/A Division o	f ENSECO	Case No	4565	
Min Sample I	DNO17213		OC Report No	140	
smple Matrix Water			Contract No.	68-01-7021	
Pambia wari	TEM		Data Sample I	Received6/24/85	·
Para Rainan	Authorized By JFM		Sate Sample		
	_	Volatile Co	empounds		•
	· Comenita	tion. (Low)	Medium (Circ	le One) A VOA C	hromatograv
	Concention	1011	7-5-8	s and Qu	ant Report.
	Date Extra	cted/Prepared	7 7 67		included for
	Date Anal	/zed	7-5-85	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	11.1.
•	Cons/Pill	Factor.		- time c	riteria only
3					
_		oisture			•
	Percent W	loisture (Decan	1ed)		~
CAS	. (ug / or ug /Kg	CAS		us 1) or us 1Ks Circle One
Number		(Circle One)	Number	1 1 2 2-Tetrachioroethane	10 M I
74-87-3	Chloromethane	IOUT	30 75.34.5	1 2-Dichloropropane	10 m 1
74-83-9	Bromomethane	10 11	370 78.87.5	Trans-1, 3-Dichloropropene	10 m i
75.01-4	Vinyl Chloride	10 M	870 79.01.6	Trichloroethene	10 m 1
75.00.3	Chloroethane	10.1	510 124.4E 1	Dibromochioromethane	10 u 1
U 75-09-2	Methylene Chloride	10 m	140 79.00.5	1, 1, 2-Trichloroethane	10 M
67-64-1	Acetone	25M	40 71-43-2	Benzene	10 M
75-15-0	Carbon Disuffide	10M	10061-01-5		10 11
0 75.35-4	1, 1-Dichloroethene.	10 10	190 110.75.8	2-Chloroethvivinylethe:	IDMI
75-34-3	1, 1-Dichloroethane	10 м	470 75.25 2	Bromoform	10 m
156-60-5	Trans-1, 2-Dichloroethene	10 M 1	591.78.6	2-Hexanone	104
67-66-3	Chloroform	10 M	108 10-1	4-Methyl-2-Pentanone	10 M
107-06-2	1, 2-Dichloroethane	10 M	127-18-4	Tetrachioroethene	10M
78.93.3	2-Butanone 1, 1, 1-Trichloroethane	10 4 1	106-BE 3	Tolvene	10M
71-55-E	Carbon Terrachloride	10 4 1	₹U 108 90.7	Chlorobenzene	10 11
108-05-4	Vinyl Acetete	10 4 1	340 100-41-4	Ethylbenzene	10 10
100.03.4	4	· · · · · ·	100-42-5	Siviene	100

Data Reporting Depthers

10 m V

For resorting results to EPA. The following results qualifiers are used Additional Rogs or featheres equipming results are encouraged. However, the Before of each bug must be expice

when I the result is a value greater than or deut to the glassicism band, special the solut

Bromodichloromethane

75-27-4

- Busicenes semeaund was analyzed for but not denocted Based the mornion detection brise for the sample with the U to 9 10U) besid on recessory concentration " Shaken screens. (This is not recessarily the distribution) Conscion bond .) The features should read U Comment was analysed for but her denoted. The Surreur & the moneyon payment descript bond for -
 - Busicenes on examined value. This flag is sent owner when someting a sensement on for sentatively Mentified compounds where a 1-1 resource is sexumed Or when the these specify data indicates the presence of a compound than proots the aboundary to not is but the result is total than the specified descript bring but ILDE, & de aven pare resource

That they beginned to production parameters where the Monthication has been confirmed by GC 'MS. Single garganent posticides >10 ng. ut in the final extract provid by sendement by GC ALS

Total Xylenes

- The flag is used when the broken is found in the blank de well as a sample is indicates possible (probable Que no partie minerion and warre the data user to take SHE SHOW BOYOUT
- Coher Doner specific Bags and features may be required to procestly define the results if used they must be fully Birectified and such description equiched to the data POST LIBOUR
 - E Indicates compound was detected and identified, but the concentration is below reporting detection limit.

10 m

Emvironmental Protection Agency, CLP Sample Management Office, P. O. Box 818, Alexandria, Virginia 22313 703/657-2490

Sample Number
JA523

A(1/65)

Organics Analysis Data Sheet (Page 2)

Semivolatile Compounds

	Medium (Circle One)
Date Extracted/Prepare	d. <u>7-9-85</u>
Date Analyzed. 7-12	-85
Conc/Dil Factor:	4 1

	\	CAS Number	(ug/lor ug/Kg (Circle One)	CAS Num
	1.18	62-75-9	N-Nitrosodimethylamine	20MJ	IB 83-32
	5	10€-95-2	Phenol	70 M 1	59A 51-2B
	7.7	62-53-3	Aniline	1 سر20	58A 100.0
	STE N	111-44-4	bis(-2-Chloroethyl)Ether	20 M	132-6
1		95-57-8	2-Chiorophenol	20m!	350 121-1
		541-73-1	1, 3-Dichlorobenzene	20 M	34.5 606.2
	116	106-46-7	1, 4-Dichlorobenzene	20 m 1	70.684.66
1		100-51-6	Benzyl Alcohol	20m!	4057005
	256	95-50-1	1, 2-Dichlorobenzene	20 M	20086.73
		85-48-7	2-Methylphenol	20 M :	100-0
	128	39638 32.9	bis(2-chloroisopropyl)Ether	20 u	LOA 534-5
	,	106-44-5	4-Methylphenol	20 M	L26 86-30
	L3B	621-64-7	N-Nitroso-Di-n-Propylamine	20 M	418 101-
	128	67-72-1	Hexachioroethane	20 m	78 118.
	عيوا	98-95-3	Nitrobenzene	20m	64A 87-B
	546	78-59-1	Isophorone	20 m	15 85-0
		88-75-5	2-Nitrophenol	20m 1	TB 120.
	344		2. 4-Dimethylphenol	20m	695 84.7
		65-85-0	Benzoic Acid	20.M	57B 206-
•	47	111-91-1	bist-2-ChloroethoxyMethan	e 20 m	55 92.8
	ايو	1	2. 4-Dichlorophenol	20m	945 129-
	70	1.00.00	1, 2, 4-Trichlorobenzene	70 M	674 B5-6
		91-20-3	Naphthalene	20 M	Feb 31.8
	ر فرع	106-47-8	4-Chloroeniline	20 M	716 56.5
	51	87-68-3	Hexachlorobutadiene	20m	640 117.
1	325		4-Chioro-3-Methylphenol	70 M	NA 218
	•	91-57-6	2-Methylnaphthalene	20 M	MB 117
	_ 27	77-47-4	Hexachlorocyclopertadiene	20M	745 205
	211	4	2, 4, 6-Trichlorophenol	20,n1	7.5A 207
	\ <u></u> '	95-95-4	2.4.5-Trichlorophenol	20 u	** 5 0:
	20	8 91-58-7	2-Chioronaphthalene .	70	7 2 193
	\	88.74.4	2-Nitroaniline	20 m 1	e18 53.
	71	8 131-11-3	Dimethyl Phthalate	20 M	
,		£ 208-96-8	Acenaphthylene	20 w	
ø	دیے ا	99-09-2	3-Nitroaniline	20 m	
		-			

	CAS		ا ۱۶ ول افرارول
	Number		(Circle One)
18	83-32-9	Acenaphthene	20 m.T
574	51-28-5	2, 4-Dintrophenol	20 m!
	100-02-7	4-Nitrophenol	20 M
	132-64-9	Dibenzofuran	20 M I
350	121-14-2	2, 4-Dinitrotoluene	20M1
	606-20-2	2 6-Dinitrotoluene	20 M
	84-66-2	Diethylphthalate	20 m l
40	7005-72-3	4-Chlorophenyl-phenylether	20,1
	86-73-7	Fluorene	20 M
عست	100-01-6	4-Nitroaniline	20m
٨مي	534-52-1	4, 6-Dinitro-2-Methylphenol	20 M
	86-30-6	N-Nitrosodiphenylamine (1)	20 M
	101-55-3	4-Bromophenyl-phenylether	20 M
	118-74-1	Hexachiorobenzene	70n1
	87-86-5	Pentachiorophenol	ار 20
	85-01-8	Phenanthrene	20m
	120-12-7	Anthracene	20 n
	84.74.2	Di-n-Butylphthalate	ا سر20
	206-44-0	Fluoranthene	20m
54	92-87-5	Benzidine	20 n
يعد	129-00-0	Pyrene	20 m
13	85-68-7	Butylbenzylphthalate	20 M
	91-94-1	3.3'-Dichlorobenzidine	70M
-	8 56-55-3	Benzola Anthracene	70 M
	£ 117-81-7	bis/2-Ethylhexyl/Phthalate	20 m
	8 218-01-9	Chrysene	20 M
2	8 117-84-0	Di-n-Dotyl Phthaiate	20M
1	205-99-2	Benzo(b)Fluoramhene	20 m
	A 207-08-9	Benzolk/Fluoranthene	20 M
<u> </u>	50-32-8	Benzo(a)Pyrene	20m
	193-39-5	Indenal 1, 2, 3-cd/Pyrene	20 M
1:	8 53.70.3	Dibenza, hAnthracene	20 n
15	B 191.24.2	Benzolg h. Merylene	204
∤ ∑	Division	1-21-34 N. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	

[1]-Cannot be separated from diphenylamine

Environmental Protection Agency. CLP Sample Management Office P. O. Box 818. Alexandria Virginia 22313-703 (\$57-2490) Sample Number

7A 5Z3

Organics Analysis Data Sheet (Page 3)

Pesticide/PCBs

Concentration: Medium (Circle One)						
. p	Date Extracted/Prepared 6-24-85					
D	ate Analyzed	7-3-85				
	onc/Dil Fact	or: a'L=1				
	CAS		up / or up / Kg			
	Number		(Circle One)			
110	319-84-6	Alpha-BHC	0.121			
1034	319-85-7	Beta-BHC	0.1			
104	319-86-8	Delta-BHC	0.1 11			
1011	58-89-9	Gamma-BHC (Lindane)	0.1 N			
100	76-44-8	Heptachlor	alu			
	309-00-2	Aldrin	0.1 11			
101	1024-57-3	Heptachlor Epoxide	0.1 M			
	959-98-8	Endosulfan I	0.1 11			
90P	60-57-1	Dieldrin	0.1 1			
	72-55-9	4 4 -DDE	0.1 11			
	72-20-8	Endrin	0.1 11			
	33213-65-9	Endosullan li	0.1 4			
946	72-54-8	4 4 -DDD	0.1 4			
79/	7421-93-4	Endrin Aldehyde	0.1 M			
97/	1031-07-8	Endosulfan Sulfate-	0.1 U			
91/	50-29-3	4, 4 -DDT	0.1 U			
	72-43-5	Methoxychior	0.2 M			
	53494.70.5	Endrin Ketone	1 0.1 M			
91	57.74.9	Chlordane	0.2 M			
	P 8001-35-2	Toxaphene	0.2 M			
112	12674-11-2	Arocior-1016	0.2 M			
	111104-28-2	Aroclor-1221	0.2 14			
	11141-16-5	Aroclor-1232	0.2 M			
100	r 53469-21-9	Aroclor-1242	0.2 11			
110	P 12672-29-6	Arocior-1248	0.2 u			
107	r 11097-69-1	Arocior-1254	0.2 11			
	11095.82.5		U.2 M			

V₄ = Volume of extract injected (ul)

V_g = Volume of water extracted (ml)

W_g = Weight of sample extracted (g)

V₁ = Volume of total extract (ul)

		511	2.7
500	WW. NA	v ₁ . 500	V,

Organics Analysis Data Sheet

	•	,	(Pag	e 1)			
ما د	b Sample ID I	e ERCO/A Division of 17210 Water unhorized By JFM		00	se No Report No intract No ite Sample R		
		•	Volatile Co	em po	unds		ر کمار
	,	Date Extre Date Anal Conc/Dil	Low acted/Prepared lyzed Factor Aoisture:	7	7-1-85 -1-85 _pH_=		R(1)85
<u>a</u>			Aoisture (Decan				
	CAS	•	ug/l gr ug/Kg {Circle One}	C	AS fumber	(Ug // or ug /Kg (Circle One)
	Number	Chloromethane	10 M		79-34-5	1, 1, 2, 2-Tetrachloroethane	
	1-10	Bromomethane	10 M		78-87-5	1. 2. Dichloropropane	100
**		Vinyl Chloride	10 4		10061-02-€	Trans-1, 3-Dichloropropene	
	75.00.3	Chloroethane	104		79-01-6	Trichloroethene	10 M
	75-09-2	Methylene Chloride	10 M		124-45-1	Dibromochloromethane 1, 1, 2-Trichloroethane	104
	67-64-1	Acetone	25 M		79.00.5		10 4
	75-15-0	Carbon Disuffide	10 11	40	71-43-2	Benzene cis-1, 3-Dichloropropene	10 1
	75-35-4	1, 1-Dichloroethene	10.4		10051-01-5	2-Chloroethylvinylether	10 4
	75.34.3	1. 1-Dichloroethane	10 4		75-25-2	Bromoform	104
	156-60-5	Trans-1, 2-Dichloroethene	1000	470	591.78.6	2-Hexanone	1DM
w		Chloroform	104		105 10-1	4.Methyl.2.Pentanone	10.44
	107-06-2	1, 2-Dichloroethane	102	- 5.	127-16-4	Tetrachloroethene	104
	78-93 3	2-Butanone	100]	106-86 3	Toluene	10 m
	71-55-6	1, 1, 1-Trichloroethane	1000	·	108-90-7	Chlorobenzene	10 4
	56-23-5	Carbon Tetrachloride	100		100-41-4	Ethylbenzene	18) 11
	108-05-4 75-27-4	Vinyl Acetate	100	┨ ===	100-42-5	Styrene	104
171	175.27-4	Bromodichloromethane	1100	j		Total Vulanes	10 4

Data Resorting Qualifiers

For resorting results to EPA the following results qualifiers are used Additional Rays or feetnesses explaining results are encouraged. However, the defines of each flag must be expice

s. If the result is a value greater than or detail to the Committee bond, separt the solut

180 75.27-4

- Bedicates sumpound uses prohysed for but not detected Report the minimum direction time for the sample with The U to 8 10UI based on recessery sencentration ! Soution actions (This is not recordarily the matrument Greece on the 1 The features should read U. Compound was analysed for but not desected. The Burners is the maximum and inside descript limit for the sample
 - Budicates on parmound value. This Roy is used ormer when enimering a concentration for territoringly Marrial compounds where & 1.1 response is secured Or when the thest spectral data indicates the presence of a compound that meets the attendication greate but The result is less than the specified direction first but grown man are to g . 100)

This they bearing to posticide parameters where the Stendification has been confirmed by GC 'MS Single serventent posticions 210 ng. ul in the final extract should be confirmed by GC MS

Total Xylenes

- This flag is used when the brishes is found in the blank de unell as a sample à mécares sociable (probable Beens compromised and worth the dela user to lake STATE OF SCIENCE
- Other Doner specific flags and features may be required to properly define the results if used they must be fully Sescribed and such Sescription attached to the 8618 SHAMELY PROOF
 - K Indicates compound was detected and identified, but the concentration is below reporting detection limit.

Emirphimental Protection Agency - CLP Sample Management Office P. D. Box 818. Alexandria, Virginia 22313-703/557-2490 Sample Number
JA524

Organics Analysis Data Sheet (Page 2)

R{1 8|12|85

Semivolatile Compounds

*Concentration: Low	Medium (Circle One)
Date Extracted/Prepared	d: <u>7-9-85</u> 7-85
Date Analyzed 7-17	2

		/	•	
	CAS		עם וכן/ פע	
	Number		(Circle One)	
=1	€2.75.9	N-Nitrosodimethylamine	20 MJ	_1
	1D6-95-2	Phenol	20 M !	5
-	62-53-3	Aniline	20 u	2
A.	111-44-4	bisi-2-ChloroethyllEther	20 n 1	
	95-57-8	2-Chiorophenol	20 M	3
	541-73-1	1 3-Dichlorobenzene	20.4	3
AF	100 45 7	1, 4-Dichlorobenzene	20 m	
-2.	100-51-6	Benzyl Alcohol	20M1	_
256	95-50-1	1 2-Dichlorobenzene	2011	3
	95-48-7	2-Methylphenol	20 u	i
128		bis(2-chloroisopropyl)Ether	20 M 1	-
	106-44-5	4-Methylphenol	70m	5
= 16	621-64-7	N-Nitroso-Di-n-Propylamine	20 M	1
128	67-72-1	Hexachloroethane	20 Mi	3
46	96.95.3	Nitrobenzene	20 M	١
-	78-59-1	Isophorone	20M1	
274	88-75-5	2-Nitrophenol	20 M	!
340		2.4-Dimethylphenol	20 M	1
	65-85-0	Benzoic Acid	20m 1	ł
43	111-91-1	bisi-2-ChloroethoxyMethane	20 M	1
ا دو		2. 4-Dichlorophenol	20 M	1
2. 2. 7.	120.02.1	1, 2, 4-Trichlorobenzene	20 M	1
-	91-20-3	Naphthalene	1 20 m	1
	106-47-8	4-Chloroeniline	20 m	1
_ 51	6 87-68-3	Hexachlorobutadiene	20 K	1
22		4-Chloro-3-Methylphenol	20 m	4
2 67.	91-57-6	2-Methylnaphthalene	20,1	1
<u> 33</u>		Hexachlorocyclopemadiene	70 M	1
2	20.00.	2, 4, 6-Trichlorophenol	20m	1
# <u></u>	95.95-4	2, 4, 5-Trichlorophenol	20 M	4
_ =	A 91-58 7	2-Chloronaphthalene	70	4
	88 74-4	2-Naroaniline	10 M	4
3 4	18 131-11-3	Dimethyl Enthalate	700	4
	208-96-8	Acenaphihylene	20 m	4
	99-09-2	3-Nitroaniline	20 m	
	<u> </u>	•		

			(1)
	CAS	·	(Circle One)
. *	Number	A	20 u T
	83-32-9	Acenephinene	
	51-28-5	2,4-Dingrophenol	20 m
501	100-02-7	4 - Nitrophe nol	
- 1	132-64-9	Dibenzofuran	20 m
	121-14-2	2,4-Dintrotoluene	20 u
	60E-20-2	2 6-Dingrotoluene	
70.8	84 -66 - 2	Diethylphthalate	20 m
40	7005-72-3	4-Chiorophenyl-phenylether	20 n
308	86-73-7	fluorene	20 n
	100-01-6	4-Nitroaniline	20 m
٨ص	534-52-1	4, 6-Dinitro-2-Methylphenol	20 m
	86-30-6	N-Nitrosodiphenylamine (1)	20 11
	101-55-3	4-Bromophenyl-phenylethe	20 M
	118-74-1	Hexachiorobenzene	20 u
	87-86-5	Pentachioropheno!	20 m
	85-01-8	Phenanthrene	20 m
	120-12-7	Anthracene	20 m
	84.74.2	Di-n-Butylphthalate	20 m
	206-44-0	Fluoranthene	20 M
370	92-87-5	Benzidine	ZO_M :
2	129-00-0	Pyrene	20 M
<u> </u>	85-68-7	Butylbenzylphthalate	20 M
5	91-94-1	3.3'-Dichlorobenzidine	20m
===	56.55.3	BenzolalAnthracene	20 u
122	\$ 117-81-7	bist2-EthylhexylPnthalate	20 M
∤	8 218-01-9	Chrysene	20 M
1 12	5218-01-8	Di-n-Octyl Phthalate	20 M
1 ₩	d 117-84-0	Benzo(b)Fluoramhene	20 11
1 22	205-99-2	Benzo(k)Fluoramhene	70 M
12:	207-06-9	Benzola Pyrene	20 M
1 23	50.32.8	indeno(1, 2, 3-od)Pyrene	20 M
12	193 39 5	Dibenza hAnthracene	201
1 27	8 E 3.70 3		20 h
7 =	191-24-2	Benzolp h. IPerylene	

(1)-Cannot be separated from sliphenylamine

Sample Number JA 524

Organics Analysis Data Sheet (Page 3)

Pesticide/PCBs

C	oncentration:	Low Medium	· .
D	ara Extracted	/Prepared 6-25	-85
		7.2.96	
	ate Analyzed	di(=1)	
. С	onc/Dil Fact	or:	(No. 180
	CAS Number		(Circle One)
	319-84-6	Alpha-BHC	0.1 11
	319-85-7	Beta-BHC	0.1
	319-86-8	Delta-BHC	0.1 11
	58-89-9	Gamma-BHC (Lindane	
100 P	76-44-B	Heptachlor	0.1 2
398	309-00-2	Aldrin	01/11
	1024-57-3	Heptachior Epoxide	0.1 U
	959-98-8	Endosultan I	0.1 24
90P	60-57-1	Dieldrin	0.1 11
	72-55-9	4.4 -DDE	0.1
44 P	72-20-B	Endrin	0. 11
	33213-65-9	Endosulfan II	0.1 1
94F	72.54-B	4 4 DDD	0.1 2
791	7421-93-4	Endrin Aldehyde	0.1 11
97/	1031-07-8	Endosulfan Sulfate	0.1 11
92/	50-29-3	4 4 -DDT	0.1 11
	72-43-5	Methoxychlor	0.2 M
	53494.70.5	Endrin Ketone	0.1 11
91	57.74.9	Chlordane	0.2 M
113	P8001-35-2	Toxaphene	0.2 M
113	12674-11-2	Aroclor-1016	0.2 M
104	111104-28-2	Aroclor-1221	0.2 11
10	11141-16-	Aroclor-1232	0.2 M
100	H53469-21-1	Arocior-1242	0.2 11
110	P 12672-29-	Aroclor-1248	0.2 M
10.	111097-69	Arocior-1254	0.2 4
111	P 11096-82-	5 Aroclor-1260	0.2

V = Volume of extract injected (ut)

V_g = Volume of water extracted (ml)

W_g = Weight of sample extracted (g)

Vt = Volume of total extract (ul)

		•	7 7
	1/0	.5720	α. †
500	W. NA	v. <u>500</u>	
	O W	- 1	•

Emirphmental Protection Agency - CLP Sample Management Office P. D. Box \$18. Alexandria, Virginia 22313 703/657-2490

Sample Number JA524

Organics Analysis Data Sheet (Page 2)

Semivolatile Compounds

Medium (Circle One) *Concentration: 7-9-85 Date Extracted/Prepared: ... Conc/Dil Factor: ____

	CAS Number		ug/lor ug/Kg (Circle One)	CAS Number		ug/lorug/Kg (Circle One)
	£2.75.9	N-Nitrosodimethylamine	20 MJ	1B B3-32-9	Acenaphthene	20 u T
~~	106-95-2	Phenol	20 m 1	59A 51-28-5	2, 4-Dinitrophenol	20 m
	62-53-3	Aniline	20 m i	58A 100-02-7	4-Nitrophenol	20 u 1
_ }	111-44-4	bisi-2-ChloroethyllEther	20 M	132-64-9	Dibenzoluran	20 m
	95-57-8	2-Chiprophenol	20 M 1	350121-14-2	2, 4-Dinitrotoluene	20 u 1
	541.73.1	1.3-Dichlorobenzene	20 u i	348 606-20-2	2 6-Dinitrataluene	20M
	106-46-7	1 4-Dichlorobenzene	20 m !	¥0.84-66-2	Diethylphthalate	20 m
3.6	100-51-6	Benzyi Alcohol	20M1	404 7005 72-3	4-Chlorophenyl-phenylether	20 n :
		1 2.Dichlorobenzene	20 M I	30 86·73·7	Fluorene	20 n
	95-50-1 95-48-7	2-Methylphenol	20 M I	100-01-6	4-Nitroaniline	204
	39638 32.9	bis(2-chloroisopropyl)Ether	20 M	LOA 534-52-1	4, 6-Dinitro-2-Methylpheno	20m
179	106-44-5	4-Methylphenol	7.0 m	£28 86·30·6	N-Nitrosodiphenylamine (1)	20 4
		N-Nitroso-Di-n-Propylamine	20 M	41B 101-55-3	4-Bromophenyl-phenylethe	20m
-38	621-64-7	Hexachioroethane	20 M	98 118.74.1	Hexachlorobenzene	20 M
138	67-72-1	Nitrobenzene	20M1	64A 87-86-5	Pentachloropheno!	20m
<u> </u>	96-95-3	Hoohorone	20m1	\$1585-01-8	Phenanthrene	20 m
548	78-59-1	2-Nitrophenol	20 m 1	715 120-12-7	Anthracene	20 m
57 A	88.75.5	2 4-Dimethylphenol	20 M	675 84.74.2	Di-n-Butylphthalate	20m
344	105-67-9		20 M I	718 205-44-0	Fluoranthene	20 M
1	65-85-0	Benzoic Acid bist-2-ChloroethoxyMethane		55 92-87-5	Benzidine	20 M
470	111-91-1		20 m	ms 129-00-0	Pyrene	20 M
٨٠٤		2.4-Dichlorophenol		676 B5-68-7	Butylbenzylphthalate	20 M
98		1, 2, 4-Trichlorobenzene	70 M	Ped 91-94-1	3. 3 - Dichlorobenzidine	20m
		Naphthalene	20 M	7.6 56.55.3	BenzolajAnthracene	20 u
	106-47-8	4-Chioroeniline		44 117-81-7	bist2-EthylhesylPnthalate	20 u
516		Hexachlorobutadiene	20 N	744 218-01-9	Chrysone	20 M
22A		4-Chloro-3-Methylphenol	1 20 m	117-84-0	Di-n-Deryl Phthalate	20 M
	91-57-6	2-Methylnaphthalene	20 m	205-99-2	Benzo(b)Fluoramhene	20 11
<u>3¥</u>	77-47-4	Hexachlorocyclopertadiene	70 M	207-06-9	Benzo(k)Fluoranthene	70 M
211		2, 4, 6-Trichlorophenol	70		Benzo(a)Pyrene	20 M
	95.95-4	2, 4, 5-Trichlorophenol	2014	193.39.5	Indenal 1, 2, 3-od/Pyrene	20 M
æ	91-58 7	2-Chloronaphthalene	70	16 53.70 3	Dibenza hAnthracene	20 M
	88 74-4	2-Naroaniline	10 M	191-24-2	Benzolo h. Menylene	20 M
<u>41</u>	a 131-11-3	Dimethyl Phthalate	700	1 101,31,42		
33		Acenephthylene	20 m		e separated from diphenylamine	
1	99.09 2	3 Nitroantine	20 m	137	a amount a same is only and a set on setting	

Environmental Protection Agency. CLP Sample Management Office, P. O. Box 818. Alexandria Virginia 22313 703/657-2490

Sample Number JA 525

Organics Analysis Data Sheet (Page 1)

		•				4565	
Lah	omion Name	ERCO/A Division o	f ENSECO	C	se No		
	O	17215		00	Report No:	140	
Leb	Sample ID N	O:	•		ntract No:	10-01-7677	·
Sar	nple Matrix: .	water				11-	15 5
Dat	a Release Au	nhorized By	7	D:	ite Sample R	eceived	
		•	Volatile Co	ompo	unds	A	12/85
	•	· Concentra		Med		e One)	ا ا ا
					1/1/85	8	,
		Date Extra	cted/Prepared				
:		Date Ana	lyzed		7/1/85		•
		5510700	Factor:	.0	pH		
		Conc/Dil	Factor:				
		Percent N	Aoisture:				
		Parcent &	Apisture (Decan	ited): .	-		
		+ Alcour	/ \		AS	,	الم الم الم
C	AS	•	ug/lorug/Kg (Circle One)		.as Iumber		(Circle One)
-	lumber		0,,	30	79-34-5	1, 1, 2, 2-Tetrachioroethane	10M
30 7	4.07.3	hioromethane	ID A		78-87-5	1, 2-Dichloropropane	100
<u>7 ان</u>	4.03.3	Bromomethane	10 m		10061-02-6	Trans-1, 3-Dichloropropene	101
30 7	5-01-4	Vinyl Chloride			79-01-6	Trichloroethene	10u
60 7	5-00-3	Chloroethane	1011		124-4B-1	Dibromochloromethane	100
	-	Methylene Chloride	10 m		79-00-5	1, 1, 2-Trichloroethane	10 m
		Acetone			71-43-2	Benzene	104
		Carbon Disultide	10 m		10051-01-5	cis-1, 3-Dichloropropene	IDU
		1, 1-Dichloroethene		190	110-75-8	2-Chioroethylvinylether	100
	, , , , , , , , , , , , , , , , , , , ,	1, 1-Dichloroethane	10 10		75-25-2	Bromoform	100
	136.00.3	Trans-1, 2-Dichloroethene	10 m		591-78-6	2-Hexanone	10 N
	67-66-3	Chloroform			108 10-1	4-Methyl-2-Pentanone	100
_	107-06-2	1, 2-Dichloroethane	10 M	8 50	127-18-4	Tetrachloroethene	10'11
L	78-93-3	2-Butanone			108-88-3	Toluene	1011
	71.55.6	1, 1, 1-Trichloroethane	104	30		Chlorobenzene .	10v
60	56.23.5	Carbon Tetrachloride	134		100-41-4	Ethylbenzene	ICM
	108-05-4	Vinyl Acetate	10 ,	┨ ===	100-42-5	Styrene	DM
	75-27-4	Bromodichloromethane	100	J		Total Xylenes	100

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used Additional flags or featness-explaining results are encouraged. However, the definition of each flag must be explicit

150

Make. If the result is a value greater than or equal to the detection bond, report the value

- braicenes commound was analyzed for bull not desected Report the minimum detection limit for the sample with the U is § . 10U) based on recessery concentration " diffusion actions. (This is not necessarily the instrument. desection limit. The footnote should read. U. Commound was analyzed for but not desected. The Sumple of the minimum stainable detection limit for the semple
- bulicates an estimated value. This flag is used enther when estimating a concentration for semiatively Mentified compounds where a 1 1 response it assumed or when the mass spectral data indicates the presence of a compound than meets the abenification presents but

- This fleg applies to posticide parameters where the Monthication has been confirmed by GC 'MS Single semponent sesticides ≥10 ng ul in the finel estrect phould be confirmed by GC /MS
- Thus flag is used when the analyse is found in the blank se well as a sample & indicates possible 'probable blank contamination and warrs the data user to take ----
 -). Other specific flags and feathers may be required to properly define the results if used they must be fully Beach ded and such description attached to the data
- K Indicates compound was detected and identified, but the concentration is below reporting detection limit.

Sample Number JA 524

Organics Analysis Data Sheet (Page 3)

Pesticide/PCBs

		Aladum	(Circle One)
Ç	oncentration	Low Medium	· -
D.	ate Extracted	/Prepared 6-25-	8.2
D	ate Analyzed	7-3-85	
	onc/Dil Fact	6/1/ - /	
			up Dor up /Kg
	CAS Number	(Circle One)	
_	319-84-6	Alpha-BHC	0.1 11
	319-85-7	Beta-BHC	0.1 //
	319-86-8	Delta BHC	0.1 11
	58-89-9	Gamma-BHC (Lindane)	0.1 M
100 1	76-44-B	Heptachlor	0.14
	309-00-2	Aldrin	0.1 11
	1024-57-3	Heptachlor Epoxide	0.1 11
	959-98-8	Endosulfan I	0.1 11
90P	60-57-1	Dieldrin	D.1 M
	72-55-9	4.4 -DDE	0.1 11
	72-20-8	Endrin	0.111
<u> </u>	33213-65-9	Endosulfan II	0.14
946	72-54-8	4.4.DDD	0.12
	7421-93-4	Endrin Aldehyde	1 0.1 M
97 6	1031-07-8	Endosulfan Sulfate	1 0.1 21
92/	50-29-3	4.4.DDT	0.1 11
	72-43-5	Methoxychlor	0.2 M
	53494.70.5	Endrin Ketone	0.1 11
- Rif	57.74.9	Chlordane	0.2 11
	8001-35-2	Toraphene	0.2 M
112	12674-11-2	Aroclor-1016	0.2 11
104	r 11104-28-2	Aroclor-1221	0.2 14
100	11141-16-5	Aroclor-1232	10.2 M
10/	r53469-21-9	Aroclor-1242	0.6 11
116	P 12672-29-	Aroclor-1248	0.2 M
167	11097-69	1 Aroclor-1254	0.2 4
	P 11096-82-		0.2 M

V_i = Volume of extract injected (ul)

V_g = Volume of water extracted (ml)

W_g = Weight of sample extracted (g)

V₂ = Volume of total extract (ul)

500	or W	NA	v. 500	- v, - 2.7
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Environmental Protection Agency. CLP Sample Management Office. P. D. Box 818. Alexandria, Virginia 22313 703/857-2490

Sample Number JA526

A{ }

Organics Analysis Data Sheet (Page 2)

Semivolatile Compounds

	Medium (Circle One)
Date Extracted/Prepar	red. <u>7-9-85</u>
Date Analyzed.	12-85
Conc/Dil Factor:	

B.				
	CAS	(•	10 vg/Kg	
_	Number		(Circle One)	
18	62-75-9	N-Nitrosodimethylamine	7 بر20	
TSA	108-95-2	Phenol	20 M I	:
. 7	62-53-3	Aniline	20 m 1	Ę
12 8	111-44-4	bisi-2-Chloroethyl)Ether	20 u	
	95-57-8	2-Chlorophenol	20 M	
268	541-73-1	1.3-Dichlorobenzene	20 m !	,
AF	106-46-7	1, 4-Dichlorobenzene	ا بر20	
	100-51-6	Benzyl Alcohol	20 m	
256	95-50-1	1, 2-Dichlorobenzene	20,4	:
	95-48-7	2-Methylphenol	20 N	
426	39638 32-9	bis 12-chlorois opropyl) Ether	204	
	106-44-5	4-Methylphenol	20 M	1
136	621-64-7	N-Nitroso-Di-n-Proovismine	20 M	ł
128	67-72-1	Hexachioroethane	20 m	l
هيو	96-95-3	Nitrobenzene	20 M	ı
548		Isophorone	201	ı
57 A		2-Nitrophenol	20 M	1
344		2. 4-Dimethylphenol	20 M	1
	65-85-0	Benzoic Acid	70 L 1	ł
42		bist-2-ChloroethoxyMethane	ا بىر20	Į
ستور 4 با	120-83-2	2. 4-Dichlorophenol	20 M	1
120		1, 2, 4-Trichlorobenzene	20 M	1
	91-20-3	Naphthalene	204	J
	106-47-8	4-Chloroaniline	20,	J
310	87-68-3	Hexachlorobutadiene	200	1
216	-	4-Chloro-3-Methylphenol	20 m	1
	91-57-6	2-Methylnaphthalene	201	1
37	77-47-4	Hexachlorocyclopemadiene	20 4	
211	10000	2.4.6-Trichlorophenol	20 M	
''	95-95-4	2.4,5-Trichlorophenol	20 M	_
. 20	91-58-7	2-Chioronaphthalene	20 M	Ц
	88-74-4	2-Nitroaniline	20 M	
- 7:	B 131-11-3	Dimethyl Phthalate	20 M	Ц
	2 208 96 8	Acenaphthylene	20 M	Ц
-1-3	99.09.2	3-Nitroaniline	20 m	

	CAS Number		ug /l or ug /Kg (Circle One)
18	3.32.9	Acenaphthene	20 u T
SAA	51-28-5	2, 4-Dingrophenol	20 m
	100-02-7	4-Nitrophenol	26 u
\neg	132-64-9	Dibenzofuran	20 m '
350	121-14-2	2, 4-Dinnrotoluene	20 M I
34	606-20-2	2 6-Dinarotoluene	70 u
	84-65-2	Diethylphthalate	2011
405	7005-72-3	4-Chlorophenyl-phenylether	20,4
200	86.73.7	Fluorene	20 1
\neg	100-01-6	4-Naroaniline	20,4
404	534-52-1	4, 6-Dinitro-2-Methylphenol	20 M
628	86· 3 0- 6	N-Nitrosodiphenylamine (1)	20 m
	101-55-3	4-Bromophenyl-phenylether	20 1
78	118-74-1	Hexachlorobenzene	20 M
	87-86-5	Pentachlorophenol	20m 1
	85-01-8	Phenanthrene	20 M
	120-12-7	Anthracene	2011
	84-74-2	Di-n-Butylphthalate	20 1
	206-44-0	Fluoranthene	اسمو
	92-87-5	Benzidine	20 M
	129-00-0	Pyrene	100 m
	B5-68-7	Butylbenzylphthalate	204
	91-94-1	3. 3'-Dichlorobenzidine	70 4
716	56-55-3	Benzo(a)Anthracene	70u
لين ا	117-81-7	bis(2-Ethylhexyl)Phthalate	30m
THE	218-01-9	Chrysene	2041
	117-84-0	Di-n-Octyl Phthalate	201
3-4	205-99-2	Benzolbyluoranthane	20 M
**	207-06-9	Benzolk)Fluoranthene	20,4
200	50-32-8	Benzola Pyrene	20 M
7.3	193-39-5	Indenal 1, 2, 3-cd/Pyrene	204
1	53.70.3	Dibenzia hAnthracene	20 M
1	191-24-2	Benzo(p.h. IParylane	20m

(1)-Cannot be separated from diphenylamine

Organics Analysis Data Sheet (Page 1)

	•	•	(Pag	e 1)			
ا ا	b Sample ID I	Date Extra	Volatile Co	Car DC Cod Da ompo Medi	Report No Intract No — Ite Sample Ro unds um (Circle 7-1-85	69-01-7027 •ceived 6-24-85 • One)	A { L 85 8 10 85
	CAS Number	Date Analy Conc/Dil F Percent M Percent M	oisture (Decan	1 - (1 - C)		1, 1, 2, 2-Tetrachiproethane	ug 1) or ug 1Kg (Circle One)
-		Chloromethane	1011		79.34.5	1. 2. Dichloropropane	104
	74.83.9	Bromomethane	10 M		76-87-5 10061-02-E	Trans-1, 3-Dichloropropene	104
		Vinyl Chloride	1011		79.01.6	Trichloroethene	104
	75.00.3	Chloroethane	10 M		124-48 1	Dibromochloromethane	10 m
	75-09-2	Methylene Chloride	10 n		79.00.5	1, 1, 2-Trichloroethane	10 u
\Box	67-64-1	Acetone	25		71-43-2	Benzene	10 n
	75-15-0	Carbon Disulfide	104		100£1-01-5	cis 1, 3. Dichloropropene	10M
Po	75-35-4	1, 1-Dichloroethene	104	L	110-75-8	2-Chloroethylvinylether	100
ارد	75-34-3	1, 1-Dichloroethane	10 M		75-25 2	Bromoform	10 M
5U	156-60-5	Trans-1, 2-Dichloroethene	10~		591.78.6	2.Hexanone	10 m
w	67-66-3	Chloroform	10 m	1	108 10-1	4-Methyl-2-Pentanone	10 M
100	107-06-2	1, 2-Dichloroethane	101	250	127-18-4	Tetrachloroethene	10 M
1	78-93-3	2-Butanone	10 11		108-88-3	Toluene	10 m
	71-55-6	1 1, 1-Trichloroethane	10m		108 90-7	Chlorobenzene	10 M
ن م	56-23-5	Carbon Tetrachloride	10 4		100-41-4	Ethylbenzene	104
	108-05-4	Vinyl Acetate	10 M	{ ``	100-42-5	Styrene	101
MIT.	75-27-4	Bromodichloromethane	10 m	J		Total Xylenes	100

Data Resorting Districts

For reporting results to EPA, the fatowing results qualifiers are used destributed flags or feathers explaining results are encouraged. However, the definition of each flag must be explicit.

Make If the result as a value greater than or equal to the descript hand, report the value

- Bediction compound was prolysed for but not derected Bason the minimum detection limit for the complet with the U to g. 10U) based on reconstanty componitation district actions (This is not reconstantly the instrument desection limit. 1The features should read. U. Compound was prolysed for but not desection limit for duration as the minimum standard desection limit for the complet.
- 3 Sedicates on assumpted value. This Riag is used entrol sufron assumpting a concentration for sensatively allowed compounds where a 1.1 response is assumed or when the most selected sensitively the propercy of a compound that meets the attentication streams but the result is test their the specified desection and but greater their zero. (e.g., 10J)

- C. This flag applies to posticide parameters where the approximation has been confirmed by GC 1MS. Single paragonent posticides 210 ng. ut in the final estilast phouse by GC 1MS.
- 8 This fleg is used when the analyte is found in the blank as well as a sense. It subscares possible "probable been consamination and werns the data user to take appropriate action."

Other Specific Regs and feathers may be required to grape the dring the results. If used they must be fully discretized and such discreption expected to the details guinnery report.

K Indicates compound was detected and identified, but the concentration is below reporting detection limit.

Form i

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Er vironinental Protection Agency, CLP Sample Management Office, P. D. Box 818, Alexandria Virginia 22313 703/557-2490

Sample Number JA 525

Organics Analysis Data Sheet (Page 3)

Pesticide/PCBs

C	oncentration	: Low Medium	(Circle One)								
Date Extracted/Prepared 6-24-85											
Date Analyzed 7-3-85											
-17-1											
Concroll Pactor.											
	CAS	(Circle One)									
_	Number	Al-ha BMC	0111								
	319-84-6	Alpha-BHC									
	319-85-7	Beta-BHC	0.1 11								
	319-86-8	Delta-BHC Gamma-BHC (Lindane)									
	58.89.9										
	76-44-8	Heptachlor									
	309-00-2	Aldrin	0.1 11								
	1024-57-3	Heptachior Epoxide									
	959 98 8	Endosulfan I Dieldrin	0.1 11								
	50-57-1	4.4 DDE	0.1 11								
43P	72-55-9	Endrin									
44,	72-20-8 33213-65-9	Endosulfan li	0.1 11								
~0	72.54.8	4 4 .DDD									
	7421-93-4	Endrin Aldehyde	0.1 11								
	1031-07-B	Endosultan Sultate	0.1 11								
		4.4 -DDT	0.1 11								
411	50-29-3 72 -4 3-5	Methoxychlor	0.2 11								
	53494.70.5	Endrin Kelone	01 4								
9.1	57.74.9	Chlordane	0.2 M								
	8001-35-2	Toxaphene	0.2 11								
113	12674-11-2	Aroclor-1016	0.2 M								
	11104-28-2	Arocior-1221	0.2 4								
	11141-16-5	Aroclor-1232	0.2 M								
16.	53469-21-9	Aroclor-1242	0.2 11								
106	12672-29-6	Aroclor-1248	0.2 M								
	11097-69-1	Aroclor-1254	0.2 4								
	11096-82-5		0.2 M								

V₄ = Volume of extract injected (ul)

V_a = Volume of water extracted (ml)

W_g = Weight of sample extracted (g)

Vt = Volume of total extract (ul)

v		or W.	NA	v, 500	v, 2.7
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Smirronmental Protection Agency. CLP Sample Management Office P. D. Box 818. Alexandria, Virginia 22313 703/857-2490

3. Nitros niline

Sample Number JA 525

Organics Analysis Data Sheet (Page 2)

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Semivolatile Compounds

*Concentration: Low Date Extracted/Prepared:	
Date Analyzed.	7-11-85
Conc/Dil Factor:	5

	CAS Number	(ug/lorug/Kg (Circle One)	_	CAS Number		(ug /l br ug /Kg (Circle One)
	62-75-9	N-Nitrosodimethylamine	50 u J	18	B3-32-9	Acenaphthene	50 M T
	106-95-2	Phenol	50 M 1	594	51-28-5	2, 4-Dintrophenol	50 u !
	62-53-3	Aniline	50 M 1	584	100-02-7	4-Nitrophenol	50 u
1	111-44-4	bis:-2-ChloroethyllEther	50 M		132-64-9	Dibenzofuran	50 µ !
	95-57-8	2-Chlorophenol	50 M	350	121-14-2	2, 4-Dinfrotoluene	50 M
	541.73.1	1 3-Dichlorobenzene	50,0	34.0	606-20-2	2 6-Dingrotoluene	50 MI
23	106-46-7	1 4-Dichlorobenzene	50 M	104	84-65-2	Diethylphthalate	50 M
	100-51-6	Benzyl Alcohol	50 M	40	7005-72-3	4-Chlorophenyl-phenylether	50 M
- (95-50-1	1 2-Dichlorobenzene	50 A	308	86-73-7	Fluorene	5D.M
==	95-46-7	2-Methylphenol	50 M		100-01-6	4-Nitroaniline	50 m 1
۵	39638 32.9	bis!2-chloroisopropyl)Ether	50 M	-	534-52-1	4, 6-Dinitro-2-Methylpheno	ا مد 50
عد	106-44-5	4-Methylphenol	50 M	628	86-30-6	N-Nitrosodiphenylamine (1)	50 n
	£21-64-7	N-Nitroso-Di-n-Propylamine	50 M I		101-55-3	4-Bromophenyl-phenylethe	5011
	67-72-1	Hexachioroethane	50 M	78	118-74-1	Hexachlorobenzene	50.M
3.5		Nitrobenzene	50 m		87-86-5	Pentachiorophenol	504
های	78-59-1	Isophorone	50 m		85-01-8	Phenanthrene	50 M
HB A		2-Nitrophenol	50 u	773	120-12-7	Anthracene	50,4
	105-67-9	2 4-Dimethylphenol	50.M	625	84-74-2	Di-n-Butylphthalate	50 M
375	65-85-0	Benzoic Acid	50 m		206-44-0	Fluoranthene	50M
		bisi-2-ChloroethoxyMethan		50	92-87-5	Benzidine	50h
	111-91-1	2 4-Dichlorophenol	50 m	1	129-00-0	Pyrene	50 M
٨ يو	120-83-2	1, 2, 4-Trichlorobenzene	50 M	13	B5-68-7	Butylbenzyiphthalate	50 M
PA		Naphinalene	50 n		91-94-1	3. 3'-Dichlorobenzidine	504
18.	91-20-3	4-Chiorpaniline	50 m		56-55-3	Benzo(a)Anthracene .	50M
	106-47-8	Hexachlorobutadiene	50M		117-81-7	bisi2-EthylhexylPnthalate	be
57.0		4-Chioro-3-Methylphenol	50 M		218-01-9	Chrysene	50m
1 A			50 M	1 1	8117-84-0	Di-n-Octyl Phthalate	504
_	91-57-6	2-Methylnaphthalene Hexachlorocyclopemadiene			205-99-2	Benzo(b)Fluoranthene	50 M
275	77-47-4				207-06-9	Benzo(k)Fluoranthene	50 M
216		2.4.6-Trichlorophenol	50 M	1	50-32-8	Benzo(a)Pyrene	50 W
_	95-95-4	2.4.5-Trichlorophenol	50 u	计号	193-39-5	Indenor1, 2, 3-cd/Pyrene	50 H
2	91-58-7	2-Chioronaphthaiene	30 h	d	8 = 3.70.3	Dibenza hAnthracene	50
	85 74-4	2-Mirroaniline	500	H ==	191.24.2	Benzo(p h. iPenylene	57
	8 131-11-3	Dimethyl Phthalate	50 Ju	ዝ ጉ	<u> </u>		/
_11	208 96 8	Acenaphthylene	- 50	1	M L Cannor be	asparated from diphenylamine	/

APPENDIX P

REPORT OF ANALYSES BENLAB - 1986 901 SOUTH 9th STREET + P.O. BOX 5816 + TACOMA, WASTL 98405 + (206) 272-4507 SEATTLE 624-0570/TELEX 152556SEA

DRAFT ======

REPORT OF ANALYSIS

TC-86-8380

AUGUST 22, 1986

REQUESTED BY:

Mr. Thomas R. Anderson, President Tacoma Industrial Properties, Inc. C S 2259, 1123 Port of Tacoma Road Tacoma, WA 98411

ANALYSIS REQUESTED:

Perform suplemental sampling and analysis of material rsidues in and around the building formerly occupied by the Griffin Wheel Co. to determine the extent of lead and other heavy heavy metals which were reportedly used in the foundry and fabrication processes of the company during its years of operation at the site.

CONDITIONS NOTED AND DISCUSSED:

Based on several meetings with the requestor and a previous overall reconisance study performed by Earth Consultants and Bennett Laboratories, primarily on the exterior of the Griffin Wheel buildings, and the general twelve acre property site, it was determined that a further study of the foundry building would be the appropriate next step in determining the extent of the contamination.

INVESTIGATION, RESEARCH AND ANALYSIS PERFORMED:

- 1. After careful inspection of the buildings for hazards which might be encountered in sampling, Messrs. George Schonhard and Bruce Chenoweth of Bennett Laboratories proceeded to the site for sampling and photographic documentation of the sample locations on August 6,1986.
- A total of 23 samples of material residues were taken from various locations throughout the buildings and suspect areas outside the main building.
- 3. After completion of the sampling and documentation, the samples were returned to the laboratory for analysis.

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4. Analyses performed were:

Initial:

- a. Lead (pb) by the total digestion method
- b. Asbestos (by phase contrast optical microscopy)

Secondary:

- a. After reviewing the results for lead, it was determined that a portion (10 samples) of the group should be analyzed for all the heavy metals plus antimony and bismuth, two of the common components of the "Babbitt metal" bearing alloys which were reportedly produced in the Griffin Wheel plant.
- 5. The results of the above analyses are tabulated in Attachment 1 of this report.
- 6. The description of the sample locations is included as attachment 2 of this report.
- 7. A locater drawing which documents the sample locations in the buildings ant the immediate surrounding area is included as attachment 3.
- 8. Photographs documenting the samples and their specific locations are included as attachment 4.

DISCUSSION OF RESULTS AND CONCLUSIONS:

- 1. No asbestos was found in the samples.
- 2. The lead values found on material residues which appeared to have been in the building for many years such as storage bins, deep floor crusted layers, and deposits on the rafters ranged from 2600 to 129,000 parts per million (ppm).
- 3. The highest lead values were found on the ground surface outside the west wall of the building, and also the wall scrapings from southwest side of the building. These contained 258,000 ppm (25.8%) and 196,000 ppm (19.6%) respectively.

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4. The supplemental analyses for the remaining heavy metals, plus Antimony and Bismuth, clearly indicate that the material residue samples reflect the normal process metals which would be used in the type of operation conducted at the Griffin Wheel Company.

BENNETT LABORATORIES, INC.

M. E. Lough Chairman

Attachments: 4

ORT OF ANALYS

ATTACHMENT I

RESULTS ARE INDICATED IN PARTS PER MILLION

SAMPLE ID	LEAD	ARSENIC	BARIUM	CADMIUM	CHROMIUM	SELENIUM	SILVER	ANTIMONY	GISMUTH
A-1*	129,000	6	46	12	157 .	<1	10	290	103
A-2	18,000				•				
A-3*	89,000	8	130	17	206	<1	5	360	63
A-4	81,000								
A-5	2,600								
A-6									
A-7	79,000								
A-8	85,000								
A-9*	113,000	7	74	37	239	2	5	230	88
A-10	60								
A-11*	62,500	10	42	23	158	ڌ	9	320	61
A-12	430								
A-13*	36,300	4	52	10	59	<1	7	110	96
A-14	21,500								
A-15	17,500								
A-16	2,600								
A-17	8,000								
A-18*	196,000	4	52	. 3	10	<1	9	300	152
A-19*	258,000	2	5	51	51	<1	. 8	120	197

SAMPLE ID	LEAD	ARSENIC	BARIUM	CADMIUN	CHEOMIUM	SILVER	ANTIMON	GISMUTH	
					1	\		\	
A-20	98,000				. /	120	1	7	1
A-21*	24,000	12	27	35	97	4	14	110	16
A-22*	73,000	3	16	53	101	<1	39	170	70
A-23*	27,300	16	90	28	168	2	5	130	19

^{*} Samples that were selected for additional metals analysis.